

RADIO AMATEUR

MAY 1992

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THE WIA RADIO AMATEUR'S JOURNAL

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Wireless Institute of Australia 1992

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Cover

This month's cover features the dish used for microwave operation by Roger Steedman VK3KRS of Sarsfield, near Bairnsdale.

The dish is 2m in diameter, and the 1296MHz contacts using it no doubt contributed to Roger's success in winning the 1991-92 Ross Hull Contest (see last month, page 38). The two kookaburras play no part, we understand, in optimising the performance!

EDITOR'S COMMENT

BILL RICE VK3ABP EXECUTIVE EDITOR

Fact and Fiction

Once a month the problem confronts me. What can I write about for this month's editorial? Happily, there are some occasions when there is a ready-made theme instantly obvious in the recent activities of the WIA or of amateur radio in general. This did not seem to be one of those months! More and more, I have come to admire those newspaper columnists who successfully dash off some hundreds of words every day, perhaps with a break on Sunday, on a wide variety of themes.

Do they perhaps have a large staff of sub-columnists helping them to achieve that elusive inspiration? Of course, they are not restricted purely to topics which have some connection with amateur radio.

"Neither are you?" says our business manager, "You spend far too much time talking about sailing, for example!" (He was only joking, I hasten to add!)

But then, when desperation almost reigned supreme, I read in this morning's paper a brief review of the life and works of the late Isaac Asimov, perhaps the most prolific science fiction writer of all time. I cannot state with certainty that he was a radio amateur, although I have a feeling that he may well have been "one of us". I can be certain that few radio amateurs would not have read some of his prolific output, or at the very least be aware of his impressive reputation.

In his lifetime (72 years; not long by today's standards)

Asimov wrote 467 articles or books, mostly science fiction novels, but a great deal of serious material as well. (It has taken me eight years to write 87 AR editorials!) Most impressively, it was his custom to write them three at a time!

Is there any real connection between science fiction and amateur radio? I think there is. Perhaps more so in past decades than in these days of CB, TV, satellites and fax. But, even now, in their formative years, readers of stories about space travel and interplanetary communication may well be attracted to amateur radio by its potential for inexpensive informal international conversation, leading on to many other things.

What other things? For a start, how about amateur satellites? It was the science fiction writer (and notable scientist) Arthur C Clarke,

who proposed geo-stationary satellites to provide worldwide communications. This was not in a novel, but in a letter to *Wireless World* in 1945.

It was hardly science fiction to begin with, but it became science fact in only a few decades. We do not yet have amateur satellites in synchronous orbit, but we're working on it! How about a repeater on the Moon?

Not all science fiction has such a happy history of becoming fact. Orwell's 1984, for example, happily didn't work out that way at all. Perhaps it served its purpose as a "horrible example".

Clarke's epoch-making 2001 has only nine years to go; by which time it may at least partially have come true. In the meantime, it has entertained millions, and made millions! More power to SF!

AR

Amateur Radio Service

A radiocommunication service for the purpose of self-training, intercommunication and technical investigations carried out by amateurs, that is, by duly authorised persons interested in radio technique solely with a personal aim and without pecuniary interest.

Wireless Institute of Australia

The world's first and oldest National Radio Society — Founded 1910

Representing the Australian Amateur Radio Service — Member of the International Amateur Radio Union

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WIA NEWS

FROM THE WIA EXECUTIVE OFFICE

Special Callsigns for Amateur Use

Details of the latest procedures relating to application for special amateur callsigns appeared on page 4 of the March 1992 issue of *Amateur Radio* magazine. The WIA expressed concern to the DoTC about the increase in delay of up to 12 months in receiving special callsigns that did not fit the standard template. The DoTC responded with the following:

On various occasions we have received requests from amateurs seeking special callsigns, which do not conform to the

format laid down by the International Telecommunications Union (ITU) Radio Regulations. If a non-standard callsign is required, we have an obligation to seek the approval of the International Frequency Registration Board (IFRB).

There have been occasions in the past where we have tended to overlook the ITU requirements. More recently, IFRB has notified us of their concerns regarding non-standard callsigns issued by the Australian Administration. As a result we are taking a much closer look at our procedures and callsign allocations for all services.

Notwithstanding the work carried out by the IFRB on behalf of all administrations, our work to co-ordinate a proposal with the IFRB is not insignificant. As a consequence, we have placed restrictions on the issuing of special callsigns, by confining them to matters of local, state and national significance. There are many wide-ranging, complex, telecommunications and radiocommunications issues that the IFRB are required to respond to. Australia is just one of approximately 160 administrations with whom the IFRB have to deal. I would suggest that, given the enormity of the IFRB's responsibilities, the consideration of non-standard amateur callsigns would have low priority. To minimise the extra-ordi-

nary work that needs to be undertaken for the approval of non-standard callsigns, we like to keep these applications to a minimum. Our experience is that it can take many months for the IFRB to finalise such requests. Occasionally, the reply is to request further information or to state that the callsign is not permissible, in which case further negotiations would be required by our Administration with the party involved.

To ensure that a non-standard special event callsign is available in time for the special event, it is recommended that one year's advance notice be given. This will provide us with a comfortable time-frame in which we can negotiate the special callsign with the IFRB. Whilst our requirements may

WIA DIVISIONS

The WIA consists of seven autonomous State Divisions. Each member of the WIA is a member of a Division, usually their residential State or Territory, and each Division looks after amateur radio affairs within their State.

Division	Address	Officers	Weekly News Broadcasts	1992 Fees
VK1	ACT Division GPO Box 500 Canberra ACT 2601 Phone (06) 247 7008	President Christopher Davis VK1DO Secretary Jan Burrell VK1BR Treasurer Ken Ray VK1KEN	3.570MHz 2m ch 6950 Rebroadcast Mondays 6pm 70m ch 8525 2000 hrs Sun	(F) \$70.00 (G) (S) \$96.00 (X) \$42.00
VK2	NSW Division 109 Wigram St Parramatta NSW (PO B ox 1066) Parramatta 2124 Phone (02) 869 2417 Fax (02) 633 1525	President Roger Henley VK2ZGJ Secretary Bob Lloyd-Jones VK2YEL Treasurer Bob Taylor VK2AOE (Office hours Mon-Fri 1100-1400 Wed 1900-2100)	From VK2WU at 1045 and 1915 on Sunday on the following frequencies and modes: (1045 only): 1.845 AM; 3.595 AM morning and SSB evening; 7.146 AM; 10.125 SSB; On relay 14.160 SSB* and 21.170 SSB; 28.320 SSB; 52.120 SSB; 52.525 FM; 144.120 SSB; 147.000 FM; 438.525 FM; On relay 584.750 ATV sound; 1281.750 FM. Plus automatic relays to 2m repeaters surrounding Sydney and manuals to several county repeaters. News headlines by phone (02) 552 5188	(F) \$66.75 (G) (S) \$63.40 (X) \$36.75
VK3	Victorian Division 409 Victory Boulevard Aurthurton Vic 3147 Phone (03) 885 9261	President Jim Linton VK3PC Secretary Barry Wilson VK3DV Treasurer Rob Hailey VK3DLZ Office hours 0630-1530 Tue & Thur	1.840MHz AM, 3.615 SSB, 7.065 SSB, 147.250 FM(F) Mt Macedon, 147.225 FM(F) Mt Baw Baw 146.800 FM(F) Mildura 146.700 FM(F) MT. Dandenong 438.075 FM(F) Mt St Leonard 1030 hrs on Sunday	(F) \$72.00 (G) (S) \$88.00 (X) \$44.00
VK4	Queensland Division GPO Box 638 Brisbane Qld 4001 Phone (07) 284 9075	President John Aarise VK4QA Secretary Bob Lees VK4ER Treasurer Eric Fildock VK4NEF	1.825, 3.805, 7.118, 10.135, 14.342, 18.132, 21.175, 28.470, 29.400, 147.000 FM(F) 52.525 regional 2m repeaters and 1296, 100 0900 hrs Sunday Repeated on 3.005 & 147.150MHz, 1930 Monday	(F) \$70.00 (G) (S) \$88.00 (X) \$42.00
VK5	South Australian Division 34 West Thebarton Rd Thebarton SA 5031 (GPO Box 1234 Adelaide SA 5001) Phone (08) 352 3428	President Rowland Bruce VK5OU Secretary John McKellar VK5BUM Treasurer Bill Wardrop VK5AWM	1820kHz 3.550MHz, 7.095, 14.175, 28.470, 53.100, 145.000, 147.000 FM(F) Adelaide, 146.700 FM(F) Mid North, 148.900 FM(F) South East, ATV Ch 34 579.000 Adelaide, ATV 444.250 Mid North Barossa Valley 146.825, 438.425 (NT) 3.555M 146.500, 0900 hrs Sunday	(F) \$70.00 (G) (S) \$88.00 (X) \$42.00
VK6	West Australian Division PO Box 10 West Perth WA 6005 Phone (09) 388 3888	President Cliff Bestin VK6LZ Secretary John Fernan VK6AFA Treasurer Bruce Hedland-Thomas VK6OO	146.700 FM(F) Perth, at 0930 hrs Sunday, relayed on 3.560, 7.075, 14.115, 14.175, 21.185, 28.345, 50.150, 438.525MHz. County relays 3582, 147.350(F) Busselton 146.900(F) Mt William (Bunbury) 147.225(F) 147.250(F) Mt Saddleback 146.725(F) Albany 146.825(F) Mt Barker Broadcast repeated on 146.700 at 1900 hrs	(F) \$60.75 (G) (S) \$48.80 (X) \$32.75
VK7	Tasmanian Division 148 Derwent Ave Lindisfarne Tas 7015	President Tom Allen VK7AL Secretary Ted Beard VK7EB Treasurer Peter King VK7ZPK	146.700MHz FM (VK7FRH) at 0930 hrs Sunday relayed on 147.000 (VICRAA), 146.750 (VICFRW), 3.570, 7.090, 14.130, 52.100, 144.100 (Hobart) Repeated Tues 3.590 at 1930 hrs	(F) \$67.00 (G) (S) \$53.85 (X) \$36.00
VK8	(Northern Territory) is part of the VK5 Division and relays broadcasts from VK5 as shown (received on 14 or 28MHz).		Membership Grades Full (F) Pension (G) Needy (Q) Student (S) Non receipt of AR (X)	Three-year membership available to (F) (Q) (X) grades at fee x 3 times

Note: All times are local. All frequencies MHz.

seem excessive, we are doing this to maximise the opportunity to finalise an application before the required date. To do otherwise could mean the failure to obtain permission for the use of the specified callsign, and an alternative callsign would then need to be considered.

In conclusion, it would be preferable if special event call-signs were constructed from the approved callsign allocation. In these cases we can respond very quickly. However, if there is sufficient justification for a special (non-standard) callsign, we would prefer as much prior notice as possible.

The standard Amateur radio format laid down by the ITU for Australia are as follows:

XXna, XXnaa, XXnaaa
where XX = Australia's internationally allocated characters (VH, VI, VJ, VK, VL, VM, VN, VZ and AX)
n = any digit
a = any alpha

Of these the available amateur blocks are: VK; VI and AX for specials.

Yours sincerely
David Hunt,
Director Licensing.

New Generation Mobile Phones

A DoTC Media Release announces a new radio frequency spectrum band plan, designed to allow for a new generation of mobile telephones. The 900 MHz Band Plan allocates frequencies for Australia's first digital public mobile telephones, soon to be offered by AOTC, Optus and the third carrier when selected.

Reciprocal Licences

The Executive Office recently received multiple copies of the DoTC Radiocommunications Information Pamphlet, RIP 73A, which is entitled "Information Paper for Overseas Amateur Radio Operators". This paper, reproduced in full at the end of WIANEWS, sets out clearly and definitely the conditions under which overseas amateurs may obtain an Australia

lian licence or visitor's permit.

The paper also outlines the procedures to be followed in applying for an Australian licence or permit, and the documents required to be provided. The WIA recommends that any amateur, who is asked by an overseas friend about reciprocal licences, should obtain a copy of this paper, RIP 73A, from any DoTC office for reference.

NZART Visitors for Federal Convention

The WIA will host two New Zealand delegates, NZART President Trevor King, ZL2AKW, and Anne McMaster, ZL3VL, at the 1992 WIA Federal Convention that this year is scheduled for the weekend of 2nd-3rd of May.

The WIA and the NZART each send delegates to the other society's Conference in alternate years. As many matters under discussion are of interest to both societies, it is beneficial to both to hear the other's views.

International Representation Fund

Now that WARC 92 is over, the tendency is to think that the WIA's commitment to International Representation will be reduced both in time and expenses. This will not necessarily be so.

IARU representation and consultation will continue, as will meetings and liaison because of WARC 92. In addition, the ongoing liaison with New Zealand must be maintained, and provision must be made for unexpected calls on our resources.

During the run-up to WARC 92, it was Executive Office policy that any donations received should be put into the International Representation fund unless otherwise directed. Many of our members included an extra amount when forwarding their membership renewals, sometimes specifying its use, other times simply rounding off the subscription total. These dona-

tions have been acknowledged individually, but it is appropriate again to acknowledge them collectively here, and to thank publicly all those who have contributed, whatever the sum. Members can be assured that all such donations are used for the benefit of the Australian amateur radio service.

1992 Radio Amateur Call Book

The 1992 Australian Radio Amateur Call Book sold like the proverbial "hot cakes". There are no copies left in the Executive Office. Perhaps some Divisional offices, or other retailers may still have some copies available.

Planning has already started on the 1993 Call Book. This may be an appropriate time to remind members to ensure that their information held in the Executive Office files is correct before it comes time to commence production of the next edition in a few months.

Amendments to callsigns of all amateurs, members and non-members, are supplied to the Executive Office by the DoTC at monthly intervals. Unless other information is on hand, it is the DoTC data that is used in the Call Book. Any alterations to callsigns, address details, or suppression requirements should be notified in writing to the Membership Secretary at the Executive Office.

Hamads

The Amateur Radio magazine editors have noted a falling off in the number of HAMADS received of late. Is this a factor of the current economic climate?

We remind members that under the current arrangements for the production of Amateur Radio magazine, it is less than three weeks from the closing date for submission of advertisements to the day on which the magazines are posted to members.

What is the closing date? At the foot of page 1 you will find the closing dates for col-

umnists and editorial copy. The Hamads close two days later than that date. If an article that you have offered for sale is sold privately after the advertisement is lodged, it is appreciated if members notify the Executive Office as items can be withdrawn as late as a week before publication, so saving the seller much bother.

Amateur Radio Magazine Advertisers

The Executive Office is always pleased to receive information about potential advertisers for either the magazine or the Call Book. This information will be promptly followed up with a letter or telephone call, as appropriate, to the potential advertiser.

Although the WIA realises that some members prefer a magazine with all articles and little advertising, we have to admit that the advertisers do help pay the costs. In turn, the WIA expects that members will inform advertisers that they notice their advertisements, and so provide feedback to them.

Members also are welcome to use Amateur Radio magazine for advertising their business or professional interests. A telephone call or letter is all that is needed to obtain a copy of the advertising rates and the deadlines.

DoTC Negotiations Update

At present many matters affecting the amateur service in Australia are under discussion with DoTC. Despite the restructuring going on within the DoTC, the WIA and the amateur service are receiving a considerable share of DoTC time.

Some of these negotiations are of necessity very prolonged.

Deregulation In accordance with the amateur service being a self regulating service, it was proposed last year that much of the current regulations could be reduced to broad principles rather than

strictly defined "rules". The WIA discussed various proposals at several Executive meetings, formed a sub-committee to collect input, circulated a draft submission, presented the final submission to the DoTC and is now in the latter stages of negotiating agreement on individual points.

The final draft document will be published in *Amateur Radio* magazine, and ARA, during June 1992 for public comment.

Low power devices The proposal to allow the use of low-power devices on specific frequency bands was raised first some years ago. The WIA was concerned with the possibility of some of these devices appearing in the amateur bands, and responded accordingly, pointing out the interference potential of such devices, and proposing specifications for them.

The demand for spectrum for low power devices has again been raised recently. DoTC has advised the WIA that the review of the use of low-power devices carried out last year identified several bands suitable for the licence-exempt operation of these devices, on a "no interference, no protection" basis and amendments to the Regulations had been made to allow their use. However, the standards proposed were non-mandatory!

While the devices are limited to, at most, 125 dBuV/m at 3 metres, some frequencies had been allocated that the WIA believes could possibly cause interference in several amateur bands.

After consultation with amateurs via the Federal Technical Advisory Committee (FTAC), the WIA has written a strong letter to the Spectrum Planning and Policy Section of the DoTC making it clear that the amateur service is not prepared to accept such devices in or immediately adjacent to amateur bands when there is plenty of spectrum available in the bands

allocated to the fixed and mobile services.

Amateur Certificates and Licences

Since the further development of examinations for amateur Certificates of Proficiency, there have been comments on the ability or otherwise of local DoTC offices to issue certificates and/or licences "over the counter". At some offices this was automatic. At others, delays were the rule.

A recent letter from David Hunt, Director Licensing at the DoTC in Canberra, clarifies this situation. David emphasises the importance of the applicant providing the necessary documentation, including the official examination results certificate, evidence of identification, and a recent passport-sized photograph. It is essential that the DoTC issuing staff be satisfied that the necessary qualifications have been attained.

In addition, David points out applicants should be aware that, if they intend to personally attend a DoTC office, delays are inevitable at times due to staff shortages, particularly in DoTC district offices. He strongly advises applicants to check with their local DoTC office first and, if necessary, make an appointment.

Obviously, the easiest and most convenient way to obtain your Certificate of Proficiency or Station Licence from the DoTC is to apply by mail.

Channel 0 and 5A Interference

A recent submission to the DoTC from the WIA Executive office has protested against the continued usage of these channels where an audio channel intrudes into exclusive amateur bands. Research by FTAC showed that there are several instances that interfere with amateur activities.

Philippines ARA National Hamvention

A news release from the Philippines Amateur Radio

Association announces that the 1992 Hamvention will be held in Zamboanga on July 11, 12 and 13, 1992. This year, as well as the general meeting and social get-together, there will be a series of lectures and symposia to cater for a wide range of interests.

For reservations or more particulars, members should write direct to:

Mr Vic Mas, DU8VSM
C/o WESMAR, G/V Lending Compound, Veterans Avenue, Zamboanga City, Philippines

ITU Day 17th May 1992

For many years it has been customary for the WIA to request permission from the DoTC each year for the use of the special suffix "ITU" by one WIA station in each state during World Telecommunications Day on 17th May.

A communication from DoTC in April 1991 advised that this allocation to the WIA has now been made on a continuing basis. Therefore one WIA station in each state is permitted to operate as AXnITU (n = state number) on that day each year.

The theme for World Telecommunication Day for 1992 is "Telecommunications and Space: New Horizons" that reflects the growing importance of space communications, and associates the ITU with the United Nations designation of 1992 as "International Space Year".

JARL Office Hour Changes

It is noted from the JARL News of March 1992 that, as from 1st April, their office hours will be reduced to a five day week, from 0930 to 1800 daily! "The new schedule is attributable to the recent trend in Japan that a five day work week has generally been established with even the banks and post offices closed on weekends".

If only we could arrange it so that some staff from the Federal office of the WIA do

not have to work on weekends! This JARL newsletter also reports on a particularly long-standing amateur radio activity, the monitoring and reporting of the activity and potential risk of further eruption of Mount Fugen. It is interesting that, in this activity, children have played a major part in passing information to the correct parties.

FCC on Code-free Licences

Apparently the introduction of the code-free Technician licence in the USA has caused something of a stir. The ARRL letter of 11th March 1992 reports that a series of objections had reached the FCC, based on the perceived need for such a licence and the absence of distinctive call-signs.

The Commission's reply refused to reconsider the establishment of the licence category, stating that other responses "clearly confirmed that the amateur community is undergoing a dramatic shift in sentiment concerning the value of Morse code as an entry level licence requirement".

The FCC also found that "for the amateur service to achieve its purposes, the participation of as many qualified persons as possible who desire to pursue those purposes is needed".

Hear! Hear!

WIA Exam Service

As at the end of the first six months of providing examination materials for amateur operator examinations, three months in tandem with the previous system and three months as the sole provider, the WIA Exam Service is working well.

Just on 300 people around Australia are now registered as accredited examiners and new applications are still arriving. One requirement for becoming a WIA Exam Service accredited examiner is the willingness to act as an information contact point for po-

tential hams. With the regular publication of lists of examiners, and the availability of lists from all DoTC offices, it is becoming easier for interested people to be introduced to amateur radio.

In this first six months of operation, WIA Exam Service examiners conducted 107 examination events enabling 557 candidates to be examined on a total of 950 examination subjects. The overall pass rate for those examinations was 48%, comparing more than favourably with previous system results. The hardest exam remains the AOCPP theory with an average pass rate of 34%, with the easiest being Novice Morse sending with an average pass rate of 75%. Despite the circumstances in which WIA Exam Service came about, and the attendant controversy, there is no doubt it is now easier to sit for an amateur examination in Australia than it has ever been.

DoTC Says "Thanks"

I quote the following excerpts from a letter just received from Roger Smith, First Assistant Secretary, Radiocommunications Division, DoTC:

"I am writing to express my appreciation to your organisation for the contribution made to the Australian delegation to WARC-92 by Dr David Wardlaw and Mr Ron Henderson....."

"Through the co-operation of many organisations such as yours, detailed preparation

was made for the Conference, and we carried an Australian brief with a significant number of proposals to obtain decisions which would facilitate new technology and expansion of services for a number of years to come. I am pleased to say that the Australian objectives were virtually totally achieved, which to a great extent was because of the combined effort of all of the members of the Australian delegation....."

"The particular contribution to the work of the Australian delegation by Dr Wardlaw and Mr Henderson deserves commendation. Both were involved in our preparations for the Conference, and Dr Wardlaw in particular assisted in preparing our brief and in some preliminary conferences. During the WARC itself, both were heavily involved in a wide range of issues well beyond their primary interest in amateur radio matters....."

"Mr Henderson assisted on a number of different committees and became involved in many issues which I am sure he would not be expected to handle. Dr Wardlaw was of particular assistance in the HF broadcasting area..... The assistance of your organisation and contribution by Dr Wardlaw and Mr Henderson is much appreciated."

The WIA has also expressed its appreciation and thanks to the two delegates.

Delivery of Amateur Radio Magazine

So your Amateur Radio magazine does not always

arrive on the first of the month! Actually, there is no reason it should.

Have you read the fine print in the top left hand corner of page 1 of every issue? The current arrangement between the WIA and the printers has been negotiated to allow the shortest possible lead time between receipt of items and publication. This period of less than three weeks is the shortest of any similar magazine.

This agreement ties the publication date to the last Friday of the month, rather than a particular date. In this way, we can have the closing date for editorial copy always on a Monday, Hamads on the following Wednesday, proof-reading always on a Thursday, and so on.

After printing on the last Friday, the bulk magazines go to the mailing house that inserts the address label sheets and seals them in plastic, delivering them to Australia Post on the following Monday and Tuesday. From then on the arrival is beyond the control of the WIA. Australia Post is in charge.

This is where some variations occur, as we have records of some issues taking longer to reach Sydney than the country towns of NSW, or reaching Perth before Melbourne suburbs.

For the 1992 issues, the mailing dates will have been:

January	31st December
February	4th February
March	3rd March
April	31st March
May	28th April

In the bottom left hand corner of page 1 there is a note asking members to check first with their local Post Offices if the magazine is not received by 15th of the month. This is the only fixed date that is used. There are very few records of the magazine not having arrived by the 15th.

Awards

At long last the certificates for the Grid Square Award and the Antarctic Award are being printed. The Awards Manager, John Kelleher VK3DP, will be starting to clear the backlog of claims as soon as possible, so please be patient a little longer.

Stolen Equipment

We all know that it happens, but that does not lessen the shock when one actually has an item of equipment stolen. One thing that can help is for the owner to add the details of the items lost to the WIA Stolen Equipment register that may be used by non-members as well as members.

This file has helped the police to return items to their owners.

Please, if notifying the Executive Office of stolen equipment, do so in writing, and provide as much detail as possible, including serial numbers and any identifying features.

Also, please notify the WIA immediately when an item is recovered.

Bill Roper VK3ARZ

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- Hard-drawn copper antenna wire.
- Aust/NZ distributor for Create antennas/rotators & Phyllystran (Kevlar) non-conducting guying materials.
- High gain VHF & UHF amateur, scanning & TV antennas.
- Butt section triangular aluminium towers for fixed or tilt-over applications (refer March/April 1987 ARJ).
- Selections of power chips and TX tubes at friendly prices.
- VSWR/PWR meters by Diamond to 1300MHz 5 models. All in stock.

This space could be earning you money!

Information Paper for Overseas Amateur Radio Operators

THIS INFORMATION paper aims to answer questions you may have in relation to the issue of an Australian amateur licence.

Reciprocal licensing agreements have been negotiated between Australia and other countries whereby amateur operators from overseas can obtain an equivalent Australian amateur licence or a temporary permit.

WHO MAY APPLY FOR AN AUSTRALIAN AMATEUR LICENCE UNDER THESE RECIPROCAL AGREEMENTS?

Overseas amateurs visiting Australia fall into three main categories and they are:

Category A

Amateurs from countries having a reciprocal licensing agreement with Australia.

The countries with which Australia has a reciprocal agreement are:

Canada, Denmark, France (including New Caledonia), India, Israel, Japan, Malaysia, New Zealand, Papua New Guinea, Poland, Singapore, Solomon Islands, Spain, Switzerland, United Kingdom, United States of America and Germany.

- Amateurs from countries in category A who are merely visiting for less than a year will be issued a temporary permit which will not be renewed.
- Amateurs from countries in category A who are intended residents will be issued an Australian amateur licence.

Category B

Amateurs from countries having no reciprocal licensing agreement with Australia but having qualifications/licences with a recognised Australian equivalent.

The countries which have no reciprocal agreement with Australia but have a recognised Australian equivalent are:

Argentina, Falkland Islands, Greece, Hong Kong, Indonesia, Ireland, Italy, Luxembourg, Malta, Nauru, Netherlands, Norway, Philippines, South Africa, Sri Lanka (Ceylon), Sweden, Vanuatu and West Indies (Cayman Islands).

- Amateurs from countries in category B, regardless of their intended residential status, will be issued a temporary permit for a period of twelve (12) months. The temporary permit will not be renewed.

Category C

Amateurs from countries having no reciprocal licensing agreement with Australia and no recognised Australian equivalent qualifications/licences.

- Amateurs from countries in category C, regardless of their intended residential status, will be issued a temporary permit, for twelve (12) months, permitting 10 Watt (mean power) FM telephony operation in the 146-148MHz band only. The temporary permit will not be renewed.

HOW IS A LICENCE OBTAINED?

It is preferable that you apply for a licence in person so that original documents can be sighted and a licence issued to you over the counter. You should apply for a licence in the state you visit first. The Department's addresses are listed below.

If you are unable to apply in person on your arrival in Australia, mail applications are accepted. If you wish to operate from your arrival in Australia, you should apply for a licence at least three (3) months before your departure to Australia to allow time for the licence to be forwarded to you prior to your departure.

WHAT DOCUMENTS DO I NEED TO SHOW?

You need to show the following documents:

- a copy of your amateur's certificate* and passport*, certified by a public notary (to be included in mail applications only);
- a completed licence application form (RF57);
- your current licence*, or a certified copy of your current licence*;
- proof, such as a visa, that your visit will not be for longer than twelve (12) months (for visitors only); and
- the current licence fee of \$435**.

Cheques or money orders in Australian currency should be made payable to the "Receiver of Public Money".

*With English translation where applicable.

** (Licence fees are subject to change on 1 Dec every year)

ARE LICENCES RENEWABLE?

Australian amateur licences may be renewed annually. We would like you to give us an Australian address in case we need to contact you while you are in Australia. However, your renewal notice may be forwarded to your overseas address if requested. Temporary permits are not renewable.

WHAT CONDITIONS APPLY?

If you are granted an Australian licence, you must comply with the conditions attached

to that licence. These are described in Departmental brochure RIB71. Amateur practices and procedures are in Departmental brochure RIB72. Both brochures are available from any of our offices. Also available from Departmental offices is brochure RIB70—Information for Prospective Amateur Operators.

CAN I USE THE LICENCE/TEMPORARY PERMIT TO OBTAIN LICENCES FROM OTHER ADMINISTRATIONS?

If you are granted an Australian licence or an Australian temporary permit as a visiting overseas amateur, you cannot use the Australian documentation to obtain licences in other countries.

CAN I USE THE AUSTRALIAN LICENCE/TEMPORARY PERMIT/CALLSIGN OVERSEAS?

The use of any licence, temporary permit or callsign, issued by the Australian administration, is limited to use only within Australia, its territories or its territorial waters.

DEPARTMENTAL ADDRESSES

Communications Manager
Radiocommunications Division

QUEENSLAND

424 Upper Roma Street
BRISBANE Qld 4000
Telephone: (07) 238 6322
(Postal: PO Box 555
FORTITUDE VALLEY Qld
4006)

NEW SOUTH WALES

9th Floor
Victoria Cross Building
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NORTH SYDNEY NSW 2060
Telephone: (02) 922 9111
(Postal: PO Box 970
NORTH SYDNEY NSW 2059)

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6 Riverside Quay
(formerly Byrne Street)
SOUTH MELBOURNE Vic
3205
Telephone: (03) 885 3555
(Postal: PO Box 6444
ST KILDA ROAD CENTRAL
Vic 3004)

TASMANIA

4th Floor
3 Brooke Street
HOBART Tas 7000
Telephone: (002) 20 5267
(Postal: GPO Box 654J
HOBART Tas 7001)

SOUTH AUSTRALIA

11th Floor East
Commonwealth Centre
55 Currie Street
ADELAIDE SA 5001
Telephone: (08) 237 5333
(Postal: GPO Box 2248
ADELAIDE SA 5001)

WESTERN AUSTRALIA

7th Floor
200 Adelaide Terrace
PERTH WA 6000
Telephone: (09) 323 1717
(Postal: PO Box 6189
EAST PERTH WA 8004)

Produced by Radiocommunications Division, Canberra ACT. Department of Transport and Communications

DC91 Direct Conversion Receiver for 80m

DREW DIAMOND VK3XU "NAR MEIAN", GATTERS RD WONGA PARK 3115

ABOUT FOUR YEARS AGO Signetics introduced its NE602 balanced mixer. A number of experimenters have presented designs using the NE602 for direct conversion (DC) and superhet receivers in radio journals. The result is that the device has become rather a promising item, challenging the MC1496, SL6440 and diode-ring in the popularity stakes. This is possibly due to the easier implementation, albeit at reduced dynamic range.

The great feature of DC is that of acceptable performance consistent with relative circuit simplicity and ease of construction. DC receiver designs are now enjoying a well-deserved popularity, having come from relative obscurity in the mid-sixties to a stage now where even commercial manufacturers have marketed them. The only DC disadvantage is that the "audio image" cannot easily be suppressed, resulting in an apparent doubling of the receive IF bandpass. To perhaps offset this to a degree is the pleasing clarity of signals thought to be due to the smaller number of tuned circuits and active devices through which signals and noise must pass.

So the NE602 offers experimenters the prospect of building a receiver with fewer parts than previously possible, yet retaining the same or better performance than a discrete component job. Fuller specifications for the NE602 may be gleaned from References 1, 2 and 5.

Here is a receiver for you to try. All the components required, including the NE602 IC, variable capacitors, printed boards and toroidal cores are available at present.

Performance

Frequency Range: Nominally 3.5 to 4.0MHz

Sensitivity: 0.5µV for 10dB S + N : N
Reception Modes: SSB, CW, DSB and AM (as DSB)

Frequency Stability: Less than 100Hz drift in any hour after warm-up

Supply Requirement: Nominally 9 to 14V at 50mA

By making full use of the balanced

nature of the NE602 the common DC problem of susceptibility to powerful unwanted AM stations and swamping by strong inband signals is significantly reduced. That is, we apply the input RF signals to the device in push-pull and extract the wanted AF in push-pull or differentially. The result is a receiver not so easily overloaded by locals, thus allowing the user to wrinkle out those sub-microvolt DX or QRP stations. The prototype is a delight to use. SSB and CW signals have been heard from all Australian states, NZ, Japan, USA and the USSR, using a 10m length wire antenna. Dozens of listening hours have resulted in only a few instances where local transmitters caused perceivable overload effects.

Equipment Required

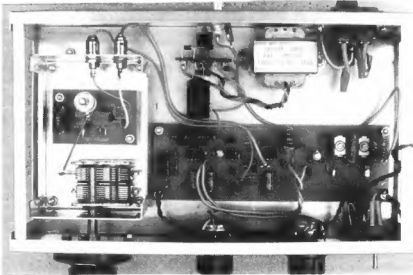
The usual electronics hand tools are required, including an egg-beater type hand drill, fine soldering iron and preferably a high impedance multimeter.

Circuit

Signals from the antenna must negoti-

ate a top-coupled band pass filter which allows those in the 3.5-4.0MHz range to enter without significant attenuation. Dual-gate FET RF amplifier Q1 provides about 0-15dB gain to incoming signals, depending on the setting of RF gain control R2. Transformer T1 converts the RF amp output configuration to push-pull, and is applied to the balanced input of the NE602 balanced mixer at U1. Input and output impedances of the NE602 are set at manufacture at 1.5kohm.

A Hartley VFO maintained by Q2 supplies our heterodyning signals, variable (nominally) from 3.5-4.0MHz, which is applied to the base of the internal oscillator transistor of the 602. Simpler designs make use of this internal transistor for the VFO. However, by employing a separate shielded VFO, we have greater control over the oscillator's environment. Furthermore, the possibility of oscillator signal being directly radiated into the RF input is greatly reduced. Direct pick-up of the local VFO and overloading of the RF amplifier are thought to be a frequent cause of disappointing performance in DC receivers.



Internal view with VFO cover removed

The audio signal, the product of the VFO and incoming signal, is applied to a differentially connected LM741 op amp at U2 configured for a mid-AF gain of about 40dB. The unwanted highs are rolled off by C16 and C17, and lows by C12 and C14. There appears to be no point in choosing a quieter chip than the venerable 741. In practice, noise from the RF amp and product detector will mask any noise contributed by the 741.

Most experimenters seem to favour the LM386 for receiver AF output applications, and it appears to be more readily available than the LM380. So here again a LM386 at U3 provides a little gain and the necessary speaker or headphone power.

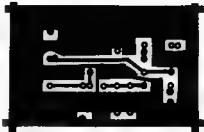
The +5V and +10V rails for the differential amplifier are supplied from two 78L05 regulator chips, one stacked upon the other as shown at U4 and U5. You could use one 78L06 for U5, and wire the board so that 12V replaces 10V, and 6V replaces 5V; omit U4 and link (i) to (o) with a 100ohm resistor substitution for U4. Unfortunately, 78L06s may not be available from some suppliers. At supply voltages of less than about +11V, the top chip loses regulation. Nevertheless, the receiver will go on working down to less than 8V. Inputs and outputs of all regulators are bypassed to discourage HF oscillation. For circuit stability, the VFO and product detector are also powered from the +5V (6V) rail.

Construction

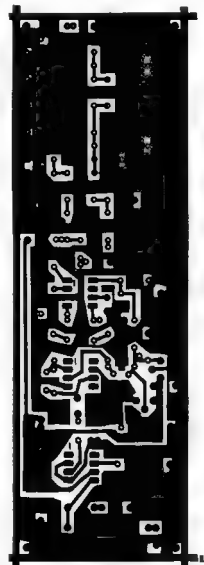
The RF amp product detector and AF amp are accommodated upon one circuit board, with the VFO on a separate board. The aluminium box housing the VFO is a stock item measuring 70W x 50H x 100Dmm. Check that your variable capacitor rotates easily without bumps or grittiness. The capacitor is fixed to the bottom plane of the box with three shortened 4BA screws. Make sure these do not touch the plates.

For easy and accurate tuning, some sort of reduction drive and dial is required. The vernier frequency dial shown is available from Dick Smith's: P/N P-7170. Also available is a reduction drive: P/N P-7172. But they have become rather expensive. Builders with engineering skills will no doubt be able to devise a better or cheaper alternative. The dial drive must not be stressed in any way, or annoying backlash may develop. No flexible coupler is necessary if care is taken with alignment of capacitor shaft and drive, although inclusion is recommended, space permitting.

Each constructor will have their own ideas about a case to house the set. There are some handy metal boxes available



Printed Circuit Board Artwork - VFO Board



Printed Circuit Board artwork - Main Board

from the usual suppliers if you want to buy one ready to drill. The case shown is a K&W C1063 measuring 255W x 77H x 155Dmm. The side brackets were added to improve rigidity. When marking out, remember to allow for the cover overhang. You may find that the nominal rear panel is quite flat, not having been sand-blasted, and would actually make a better front panel. Power supply and/or speaker may be internal, although an external speaker should give a cleaner sound. If an internal converter for other bands is planned, remember to allow room for expansion (see Ref 4).

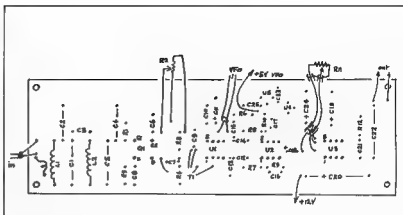
The VFO may be tackled first. The trim capacitor shown at C27 is an air-spaced 25pF 'beehive', the pins of which must be bent down to enter fully. Drill holes in the board to suit your particular trimmer. The stator, fixed plates, connection for C26 is made to the solder tag of C27. For L3, wind on 26 turns, then pull out about 2cm of wire and twist into a little pigtail loop for the source tap, then continue with the remaining eight turns. When soldering L3 into position, clean and tin the leads first, and be sure it sits down upon the board. Fix it there with a blob of epoxy glue. Make a 1cm hole in the VFO cover directly above trimmer C27. If you have access to a second receiver, VFO operation and range may be checked by applying 5 to 9V, perhaps from a small battery, and listening to the VFO signal. A short clip lead inserted in the output socket will radiate a good sample. With the cover in place the VFO note should sound pure and constant. Adjust C27 so that rotation of C26 has a range of just less than 3.5MHz to just over 4.0MHz. If for some reason the desired range is not obtained C28 may be replaced with a larger or smaller value as required. No second receiver? Never mind. Your nearly completed receiver will allow you to find 3.5MHz and 3.8MHz (see Testing below).

Broadband transformer T1 may be wound as follows: take three 300mm lengths of #24 B&S enamelled wire - different colours if available. Lay them parallel to each other, then twist one end of the triplet together. Clamp that end in a vice. Twist the free ends together and then fix them in the chuck of a hand drill. Whilst maintaining tension on the group, turn the drill until you have about three twists per centimetre. The resulting twist must be uniform, with no kinks or transpositions. Give the drill a pull to set the twist. Carefully wind the triplet onto an Amidon FT50-43 core. About 11 loops, not critical, should fit nicely. Untwist the ends and leave about 2cm of each wire. Remove about 1cm of enamel from each wire. With your multimeter on ohms,

tronic World, ph (03) 723 3860 (will answer mail orders). Stewart Electronics (03) 543 3733 can also supply most parts. Other Amidon suppliers regularly advertise in the Hamads of this journal.

References and Further Reading

- 1 Simple Receivers from Complex ICs - Parrott W6VEH, *Ham Radio*, Nov '88.
- 2 Simple Direct Conversion Transceiver - Kreuter WA3ENK, *Ham Radio*, Dec '88.
- 3 The Neophyte Receiver - Dillon WA3RNC, *QST*, Feb '88.
- 4 "Computarock" Receiving Converter - Diamond VK3XU, *AR* June, '91.
- 5 The "Sudden" Receiver - Dobbs G8RJV, *Prac Wireless*, Mar '91.
- 6 "APC" Receiver - Hepburn VK3AFQ, *ARA*, Vol 14, No 3.



Component Locations - Main Board



Component Locations - VFO Board

Parts List
 Capacitors
 47pF NPO ceramic
 10pF NPO ceramic
 25pF "bessive" trimmer
 55pF compression mica trimmer
 100pF air variable (100 + 200 available)
 120pF polystyrene "Styrostat"
 150pF polystyrene
 220pF polystyrene
 4700pF (0.0047µF) "GreenCap" polyester
 0.1µF ceramic or monolithic
 1µF electrolytic
 10µF electrolytic
 220µF/16V electrolytic
 470µF/16V electrolytic
 220µF/25V

Resistors (all 1/8W)
 10ohm
 100ohm
 2.2Kohm
 3.3Kohm
 50 or 25Kohm log pot
 100Kohm log pot
 100Kohm
 220Kohm

Semiconductors
 MFE131, 40B73 etc
 MPF102, 2N5457 2N4416 etc
 NE602
 LM741 etc
 LM386
 78L05 +5V reg IC (or one 78L06, see text)
 7812 1A +12V reg IC
 IN914, IN4148 etc
 1A, >200V diode

Inductive Components
 Amidon T68-2 core
 Amidon FT50-43 core
 Amidon FB43-101 bead
 15V or 30V >100mA transformer

Miscellaneous

Case to suit (or material for same), VFO box, printed circuit boards, vernier dial, knobs, DPDT power switch, 500mA fuse and holder, phones and antenna connectors, RCA type plugs and sockets for VFO (the cheap kind, 2 ea), screws, nuts, spacers (10), #24 (0.5mm) and #22 B&S (0.6mm) enamel wire, hook-up wire, shielded wire, 5-tag strip, power lead, 4 or 8ohm speaker

Location
 C26, C31
 C3
 C5
 C27
 C1, C5
 C26
 C4
 C2
 C26
 C13, C15, C16, C17
 C6, C7, C8, C9, C10, C12, C14, C21, C23, C25, C30, C33, C34
 C18
 C11, C19, C24
 C22
 C20
 C32

Location
 R12
 R4, R5, R6, R14, (R15)
 R7, R8
 R1
 R11
 R2
 R13
 R3, R9, R10

Location
 O1
 O2
 U1
 U2
 U3
 U4, U5
 U6
 D1
 D2, D2, (D4, D5)

Location
 L1, L2, L3
 T1
 Gates of O1
 T2

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A Five-band Version of the VK2ABQ

Variations on a Theme

MARTIN DEELEY VK3FMD 10 MARLBOROUGH AV BRAEMAR 3193

THE VK2ABQ ANTENNA has interested me since I saw the G6XN-modified version. Bill Rice's article (AR Oct '90) threw down the gauntlet, and I decided to try for a five-bander.

The Hardware

The central support is a 600mm square of 6.3mm ($\frac{1}{4}$ ") aluminium plate. In the centre is cut a hole sized to clear the O/D of the mast, in my case, 50mm (2 "). On the underside of the plate, on the circumference of the hole and perpendicular to the plate, I welded a 300mm length of aluminium angle. This will allow the antenna to be slid up and down the mast for tuning and maintenance.

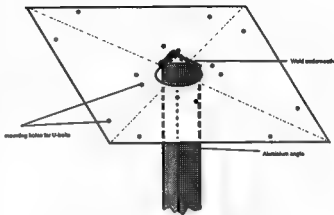
For the spreaders, I used four 6m telescopic fibreglass fishing poles, discarding the top two sections for future use as spinning rods. For attachment to the central support I fitted 300mm lengths of 40mm diameter aluminium tubing over the end of each pole, bonding it into position with fibreglass resin. The poles were fixed in their extended position by a self-tapping screw at each joint and then fixed to the central support with U-bolts.

To support the wire elements, on the spreaders I attached 150mm lengths of light elastic cord (the type available from yacht chandlers) with a hook at the free end, at points about 250mm outboard of the expected suspension point of each element. This keeps each element under reasonable tension whilst still allowing for adjustments.

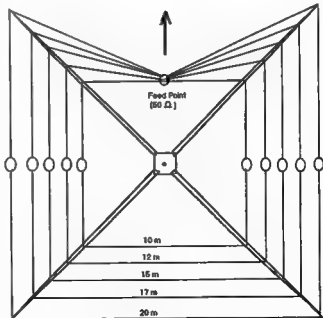
For insulators I used high impact styrene sheeting, mainly because I had some, but it just happens to have a dielectric constant of 2.5, which is about the same as the stuff coat buttons used to be made of. I simply cut the sheet into 25mm squares and pack-drilled two holes 6mm apart.

The wire used is black PVC insulated multi-strand copper wire, known here as "auto wire". (Also "ex-stock".)

At the feed point I initially used a 1:1 balun. Previous articles suggest that this isn't necessary, but I had one, and now I wish I hadn't. For some reason, it threw out the tuning of the entire antenna, and



Aluminium central support bracket.



Modified VK2ABQ, plan view

when I removed it, everything started to behave again.

Tuning

With the first loop, for 20 metres, I followed earlier articles and dipped the loop prior to cutting and fitting insulators.

The loop dipped at 13.975MHz (with some difficulty). So I decided to make no adjustment and go ahead with construction. When I had the 20m element built, I checked resonance with a (very) small RF signal and a VSWR meter.



Dip of resonant point.

The resonant point hadn't moved and I decided to be lazy and build the other elements without dipping the loops. The dimensions I used for each element are shown in table 1. (It's perhaps a good idea to start with each element a couple of percent longer, but remember if trimming after cutting the loops to trim exactly the same from each of the four ends!)

When all five elements had been fitted,

I soldered the common connection points at the feed point and raised the beast to a height of about eight metres, feeding at this stage with RG58U. The first results were amazing! Resonance was in-band on 20, 15 and 10, slightly high on 17, and slightly low on 12. Adjustments were made to the lengths of the elements by adding or subtracting equal lengths of wire at the four ends near the insulators. Only the 10m element originally tested above VSWR 1.5:1, and this I found to be due to a feedline effect. I increased the length by a few centimetres and was rewarded immediately. Feedline lengths to avoid are odd multiples of $\lambda/4$ on any of the bands the antenna is used on. With the help of friends locally and overseas, I have made tests on all bands, 20 through 10 metres. Approximate results are shown in table 2.

The "clothes line", as one friend has christened it, has now been in service for a couple of months. Band conditions have, of course, been terrible, but during the few moments of reasonable propagation we have had, I have been well satisfied with the reports. It would appear from comparative tests, and from my performance in "pile-ups" that the antenna is performing at least as well as the average tri-band trapped Yagi. Not bad for a total expenditure of about \$150!

Table 1

Frequency (MHz)	Loop length (Metres)	Radial length (Metres)
14.20	21.127	3.735
18.15	18.575	2.930
21.20	14.151	2.500
24.90	12.048	2.130
28.50	10.528	1.880

Table 2

MHz	VSWR	Bandwidth	F/S Ratio	F/B Ratio
14.18	1.30:1	0.8MHz	-30dB	-10dB
18.10	1.05:1	0.7MHz	-20dB	-10dB
21.20	1.20:1	0.7MHz	-20dB	-10dB
24.88	1.30:1	0.6MHz	-20dB	-10dB
28.48	1.20:1	0.8MHz	-20dB	-10dB

Finally, on mechanical strength, the antenna is extremely light (less than 10kg) and has a remarkably good wind resistance which is essential for those of us who live on the shores of Port Phillip Bay. It does have a tendency to droop a little, however, and this is accentuated by the tensioning of the element wires. I have a Cushcraft ARX-2 2m antenna mounted above the "clothes line" and have run some light nylon fishing line from a point about one metre up the ARX-2 to the end of each fibreglass spreader. This prevents the droop, and also appears to have introduced a little stiffness into the structure.

Hmmm ... how about another element for 67 ... or 40 perhaps?

■

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Noise Figure Measurements Over the Years

CHRIS SIEKER VK5MC SUNNYBROOK BOX 930 MILLICENT 5280

What's this Thing Called Noise and Where Does it Come From?

SO WHY ALL THE FUSS about noise? We know that noise is random electromagnetic radiation. The HF operators know all about it. Car ignition, lightning crashes, power leaks, auroras are typical sources. We know that it tends to peak at certain frequencies, but covers a wide range of frequencies.

Apart from all that, an amateur could be forgiven for thinking that if it wasn't for those sources we could just add on more and more amplification and have an almost infinitely sensitive receiver.

Here's some simple physics to explain the bad news.

Many, but not most, things in our universe are made up of atoms and molecules. Each atom in turn consists of smaller "particles" most of which are in the central core or nucleus, while some are in orbits at varying distances from the nucleus. Many of these tiny "particles" carry a charge either positive or negative.

These atoms and molecules are in constant motion. We call this motion "temperature". The more vigorously they jiggle the hotter we say they are.

The only time these atoms and molecules stop moving is when the temperature is at 0 degrees Kelvin. In everyday language that's about -273 degrees Celsius. (By the way, strange things happen to some materials at low temperature but that is another story.)

The movement of the particles is accompanied by rapid changes in velocity. Now, when an electric charge accelerates, it generates an electromagnetic field which is radiated.

The less the jiggle (low temperatures) the lower the frequency of the radiation and the less energy is radiated. Note that because a body at a particular temperature is really an average of the motions, the radiation actually covers a wide band of random frequencies (noise). As the jiggles speed up, so does the average frequency and the intensity of the radiation.

So, everything in the universe (even space isn't empty) is sending out electromagnetic waves which, if we hear with a radio receiver, we call radio waves or, if we receive with our eyes or a telescope, we call light waves.

What this means is that your backyard at 293deg K is radiating RF, the family dog at 313 deg K is radiating RF and space at 3deg K is radiating RF, the only difference being in a shift in the frequency peak of the energy and a considerable difference in the intensity. Higher temperature objects tend to have the spectrum shifted to the higher frequencies (remember red hot steel is not as hot as white

hot steel which has more blue light in it.)

This is why most modern graphs of receiver performance use degrees Kelvin instead of dB. A temperature measurement is a more fundamental indicator of the radiated energy and is directly related to noise output. On the other hand, dB is obtained by definition and is just a ratio related to a standard.

So now you'll see that Chris' article describes receivers at the threshold of the ultimate performance. The front end is so quiet that significant improvements must now come from improved gathering of the signal from the desired direction. A poor front-to-back ratio of an antenna means that there could be more energy coming from the ground (293deg K) at the back of the antenna than signal from the desired source. You'll also see why valves with a hot filament have limitations on performance and why early solid state amplifiers for space use were put in liquid nitrogen to reduce generated noise.

Dedicated amateurs of the future may have liquid-nitrogen-cooled antennae, feedlines and relays! It might help if you were a refrigeration engineer too.

PS: The majority of the "stuff" in the universe is plasma, where the movement of the particles is so vigorous that the electrons have been stripped off and the state is no longer solid, liquid or gas. Stars are made of plasma. The above description holds true for plasma, too. Apart from thermal agitation there are other interesting ways that electromagnetic radiation can be generated in nature. Pulsar stars, natural sparks, ionic blasts and laser action are other processes that make fascinating study. (The preceding introduction is by John Drew VK6DJ).

Anybody who has ever constructed or owned a receiver would have thought at some stage, "I wonder if I can make it slightly more sensitive by adjusting or modifying it?" Now, most of us have something to measure the transmitter power, even if it is a crude SWR bridge, but only a handful of amateurs have anything to measure a receiver's sensitivity.

I guess that this is one of those town versus remote country location situations. If you can hear the power leak and ignition noise it's not much good making it louder. In my location both are a rarity, and I hope it remains that way.

However, I have heard some people say that they had no car ignition noise, that is, until they made a pre-amplifier.

Since most of my activity over the years has been 144MHz and up, one of

my interests has been the adjustment of receivers or converters, as they normally were in those days, unless you had a SCR-522. My first receiver on 144MHz was a super regenerative one which used a 955 valve. It was made from a 288MHz unit by putting on a few extra turns. The best DX was to Victor Harbour (270km). However, it had lousy selectivity.

My first converter was described in February 1959 *Radio, TV and Hobbies* (now *Electronics Australia*). It was a design using a 6BQ7 RF amplifier, 6BL8 mixer and 12AT7 oscillator. The only adjustments done were on a push and pull basis, with self supporting coils. To lower the resonant frequency, you would push the coil together, to raise the frequency, pull the coil open, depending on which end of the test rod, with an iron dust slug on one end and a brass slug on the other, made the signal stronger when inserted inside the coil.

My first instrument for measuring sensitivity was a noise source made from a 1N21 diode, a potentiometer and a battery. (RSGB 1961).

The reverse biased diode generated some noise, which was measured with an AC voltmeter across the speaker leads.

The method used was to measure the residual noise and increase the current through the diode until the noise output was double. The current was then measured. Any adjustments could then be made to the converter and the noise output re-measured. This simple device, however, could not tell you any value of noise figure. It only told you if your adjustment had made it more or less sensitive.

Mark "2" was made. This consisted of a CV-2171 temperature limited diode noise valve, which gave a calibrated amount of noise for a certain current. The method used then was to establish a reference level, switch on the noise source and switch in a 3dB pad in the IF line. The current through the noise tube was then adjusted so that the output remained the same. Over the years, one became quite adept at switching one off and one on, whilst watching for minute variations on the "S" meter or output meter. Any adjustments to pre-amplifiers, at that time U310 FETs, had to be made and then

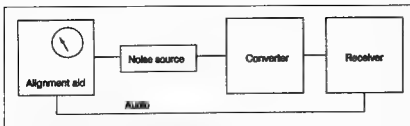


Fig 1. Alignment aid for VHF receivers.

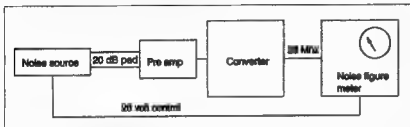


Fig 2: Mark "5" Noise Figure Meter.

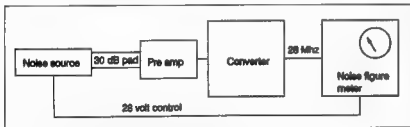


Fig 5: Mark "6" DJ9BV Noise Figure Meter

rechecked on the noise figure meter, with more flicking of switches. The results received were always fairly good, as nobody had ever seen an excess noise calibration chart in those days. The charts indicate you need to add 0.5dB to the noise figure on 144MHz, as the diode generates more noise on 144MHz than at its calibration frequency of 30 MHz (ref 2).

Mark "3" noise alignment aid was a very simple automated device that pulsed the noise source (fig 1 and ref 1). It was quite adequate to tune the front end of a receiver for maximum sensitivity by ear; the meter however gave a better indication. After the switch flicking procedures it was a pleasure to watch the meter move as you adjusted the bias, the coupling and the resonance capacitors. However, for any idea of what the noise figure really was, it was back to 'Mark 2' to check how well it was actually working.

By now somebody is going to be thinking, why not use a signal generator and simply peak for maximum gain. This is fine for an initial alignment. Transistors and FETs however don't have their mini-

mum noise at their maximum gain point. To make matters worse, the signal from my HP608E is still quite strong with the attenuator at minimum output of -125dBm.

K9IMM Edward Gislake (Ref 3) described at that time the ultimate automatic noise figure meter with a temperature limited diode valve. As I already had the noise source, "Mark 4" was constructed. It used the twice power method, which automatically switched in a 3dB pad and adjusted the current through the diode to give a measure of noise figure automatically.

At this time the new GaAsFETs were starting to appear at reasonable prices, \$35 each, and dual gate GaAsFETs for \$10, with noise figures of less than 1dB.

Which meant most "state-of-the-art" people were trying to measure something less than 1dB. Even with the best equipment in 1979, a HP340B and 343A noise head, 0.5dB was the best accuracy you could expect.

Late 1980 saw the arrival of a solid state noise source, a simple reverse biased transistor junction (2N918). This would produce about 35-36dB of noise at 144MHz which, with a simple current

limit, would give a saturated output. Its high output level could be used with a 20dB pad to give a reasonable SWR (ref 4). Because of Mark 4's design, however, this noise source could not be used.

In *VHF Communications* (ref 5) Martin Hohhus described an automatic noise figure using the Y factor method (Ref 6) and a solid state head. This allowed for a noise source output of between 10-20dB of excess noise for the various frequencies. See block diagram figure 2.

"Mark 5" was constructed and has been in use here on 144MHz, 432MHz and 1296MHz. The largest problem with this noise figure meter is that the noise source ENR (Excess Noise Ratio) was not constant with frequency. The audio AGC system did need some care to keep the input level correct for a good indication.

By varying the ENR calibration control you can make the noise figure read what you like. In my situation, as I have been looking for a comparison, this has not been a problem.

However, above 1296MHz the useful ENR of a 2N918 falls below a usable level, so yet another noise source change. This time a solid state noise diode BAT-31 (ref 7). This noise source gives a relatively constant 16dB ENR up to 10GHz; however it did require a 28 volt switched supply, so Mark 5 was modified to handle both noise sources.

With the advances being made with the GaAsFETs and HEMT (High Electron Mobility Transistor) technology the magical 0dB is very close to obtainable. Even the best equipment on odd occasions would give, or could be made to give, a reading below 0dB! Many people were finding low noise pre-amplifiers which had been tuned up on the bench and put into service, were not performing as well as they should have.

Articles were published on how to optimise a preamplifier by introducing pieces of coaxial cable in front of the pre-amplifier, believing that the instrument was perfect and could not be giving a false reading. This technique was actually inducing an error in a maximum way to make the noise figure read better than it actually was.

The noise figure error is caused by a gain error related only to the changing magnitude of the noise source reflection coefficient and the interaction of the pre-amplifier between the ON and OFF state. Consequently a 0.36dB change in the noise figure may be induced into the reading.

This error could be made worse if the device being tested was potentially unstable (Ref 8).

There are two solutions to this problem with 15dB ENR noise sources.

* Add an isolator in front of the noise source which will change the ENR by the loss through the isolator.

* Use a 10dB attenuator to give an ENR of approximately 5dB.

A good comparison of the gain error and resultant noise figure error which can occur between a noise source with a 15dB ENR (HP346B) and a 5dB ENR (BAT31-30) is reprinted with kind permission from Rainer DJ9BV in figs 3 & 4.

Enter "Mark 6", Rainer Bertlmeier DJ9BV (refs 9, 10, 11), has produced a design of a PANFI (Precision Automatic Noise Figure Instrument) which can use a 15dB or a 5dB excess noise source. This has ENR controls for both noise sources so that once the ENR is known for each band, a reasonable calibration can be made. This will not give an absolute noise figure reading unless you have something to calibrate it from, but it will give a good comparison between two pre-amplifiers or converters.

To obtain a good reference of noise figure I recommend construction of a MAR 6 or MSA06xx MMIC amplifier (using "N" connectors in and out) that can be measured on a HP8970A and HP346A at the various frequencies and then can be used as a standard reference when required.

It must be remembered that if the antenna you use is not exactly 50 ohms, you may still have a mismatch problem to the pre-amplifier. Once the DC parameters have been set and you know the device performs well, a final touch of the input matching of the pre-amplifier in its final working situation may be needed for best performance.

In my situation, as I can select polarization at my dish feed, I connect the noise source minus attenuators to my vertical feed and listen on the horizontal. Provided the antenna is pointed to cold sky, it is possible to tune the system using a noise figure meter for best performance and include the feed and relays as they would normally be used for receiving.

As a final performance check, using an antenna that can be elevated, it is possible to use the difference in noise between

1. sun noise to cold sky;
2. cold sky to ground noise; or
3. a cosmic radio source to cold sky to determine noise figure.

These measurements can be made in two ways with the receiving system in its widest bandwidth SSB position.

1. by placing a variable attenuator in the IF line and using a reference level - preferably the audio output of the receiver with the RF gain wound back or the AGC switched off;

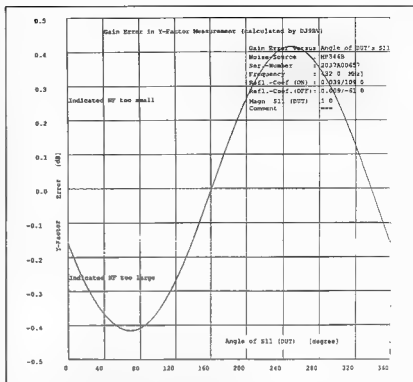


Fig 3: Gain error for 15dB ENR HP346B noise source.

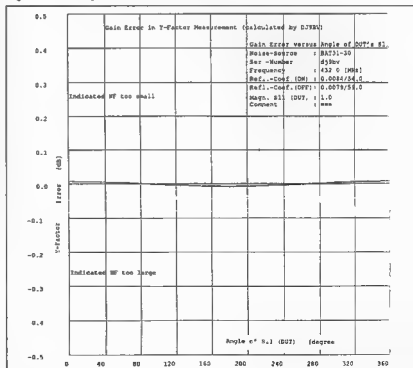


Fig 4: Gain error for 5dB ENR BAT31-30 noise source. Fig 5: Mark "6" DJ9BV noise figure meter.

2. using an audio meter calibrated in dB. Although I suggest you check it out with a variable attenuator so that you know there is no compression or linearity problems;

The most common test for receiver evaluation that is independent of antenna gain is the cold sky to ground noise. Simply point your antenna at a cold point in the sky and then into the ground 3-5 degrees, noting the difference in noise. Pointing your antenna at the horizon is not enough, as ground reflections may give you an erroneous reading. The dB difference is entered on the vertical axis and your system noise figure is read on the horizontal axis of figure 6. You do need to estimate your antenna temperature. This chart is reprinted with kind permission of Charlie G3WDC.

Dr Charles Suckling G3WDC and Drogo Dobricic YU1AW have discussed these methods in greater detail (refs 13, 14) for those who wish to make a study of this approach.

It is possible to optimise a system using one of the noise sources but it can be very time consuming and frustrating.

When checking pre-amplifiers of the masthead variety on a noise figure meter, the first thing that is noticed is the increase in noise figure from the loss in reception, especially the cheaper ones. This is partly overcome when the pre-amplifier is in use, but remains as a loss in power when transmitting something you can measure.

Over the years I have seen a few red faces and some smiles when checking a "you beaut" pre-amplifier or converter.

However, I have measured my receivers and have tried to keep up with the technology as the new devices and test equipment has appeared.

I often think of how inaccurate some of the early measurements must have been, especially on the temperature limited diode noise source and a GaAsFET pre-amplifier. Hopefully this collection of information may clear up some of the misconceptions that are around.

The current situation at VK5MC is that my antenna and relays are limiting my system. That, however, is another story.

I wish to thank the many amateurs who made this story possible by providing assistance, fellowship and encouragement over the years of experimentation. Without their help this story would not be possible.

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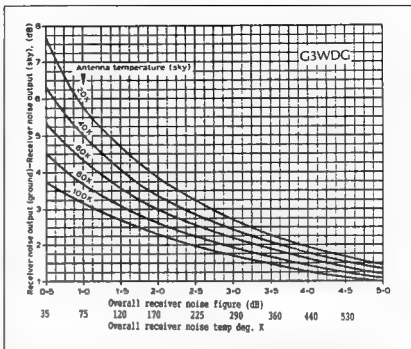


Fig 6: Receiver noise figure by sky/ground measurement. Antenna temperature is approximately 20k for low side lobe horn, 50-80 K for .6 F/D dish and 30-50 K for a well designed yagi.

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Vertical Antennas for DX

J A GAZARD VK5JG 2 CORBIN RD MEDINDIE GARDENS 5081

A ROTARY BEAM ANTENNA, Yagi or Quad, is by far the best antenna for working DX, and it is also by far the most expensive and difficult to erect. There are, however, much simpler and cheaper antennas which will perform quite well, especially when CW is used.

The chief requirement of an antenna for DX is that it should have a low angle of radiation. The vertical antenna has this property but, in its usual form of a quarter wave fed at its base against ground, its height is too low. There are two other types of vertical that can be raised above ground, and these are very suitable for DX working.

The first is the Ground Plane (GP) antenna. A high mounted GP antenna would consist of a quarter wave aluminium tube fixed vertically to the top of a tilt-over pole and fed by a 50ohm coaxial cable. The radials could be 16swg or larger wire sloped down to points above the ground. The angle of the slope below the horizontal is not critical because, whatever the angle, the SWR will be less than 1.5:1. The optimum angle is about 25 degrees where the SWR is close to 1:1. Only two radials are necessary and they should be equal in length, exactly opposite, and slope at the same angle. The antenna can be tuned to resonance by adjusting the length of the radials to give minimum SWR. This adjustment is made easier if the radials are cut 10 percent longer than a quarter wave and looped back through an insulator at the lower end.

The GP antenna elevated in this way has useful height and is clear of ground obstructions. I have found it performs very well and have noted that many DX stations were using this antenna.

The other type is the half-wave antenna mounted vertically on the top of a tilt-over pole. With this type of mounting it is difficult to keep the centre feeding cable clear of the antenna, so end feeding with open wire feeder is preferred. A tuning unit is needed to match the transmitter to the feeder. The impedance to be matched will depend on the length of the open wire feeder, and will vary from very high to very low as the feeder length varies from an even to an odd multiple of a quarter wavelength. Figure 1 shows the current values in the antenna and feeder and also the impedance at points

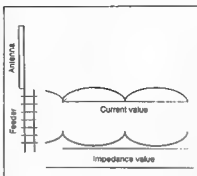


Figure 1

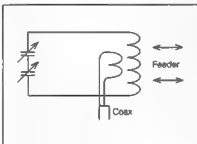


Figure 2

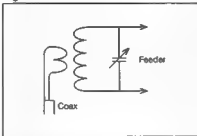


Figure 3

along both. The curves indicate that the antenna is voltage fed and the current in the antenna is a 100 percent standing wave.

A standard tuning unit for use with open wire feeder is shown in fig 2. The tuning capacitor tunes the coil to resonance, but the impedance match involves the ratio of the number of turns on the link coil to the number of turns between the feeder tapping points. The split stator capacitor is used to keep RF off the rotor and chassis which can then be grounded. If a single capacitor is used, it will have to be mounted on an insulating panel, as both sides will be "hot" with RF.

The Alcan Company (and probably others - Ed) makes aluminium tubing in sizes rising by $\frac{1}{4}$ " from an outside diameter of 0.5" up to 1.5" and the wall thickness is such that any size fits neatly into the next size above. The tubes can be joined by cutting a slot longitudinally in the outer tube, sliding the smaller one in and clamping the join with a stainless steel hose clamp.

A vertical half-wave antenna for the 21MHz band was set up using a half-wave length of aluminium tube mounted on the top of a 10m high tilt-over pole. Three equal lengths of $\frac{1}{4}$ ", $\frac{1}{2}$ " and $\frac{1}{2}$ " tubing were used to make an antenna 6.74 metres long. This produced a tapered antenna which reduces wind loading while maintaining strength at the base.

The feeder was made from two lengths of 7/029 (electrician's earth wire) spaced 50mm apart with perspex spreaders. As the feeder was close to a half-wave long, the tuning unit would need to match a high impedance. After several attempts, the final version was assembled with a 50pF wide-spaced ceramic capacitor (mounted on hardboard panel) and a 22mm 14-turn close-wound coil made from 16swg enamel wire. A two-turn link coil was wound over the centre and connected to the transmitter with 50ohm cable.

The turns ratio with this coil was 7:1 so the impedance ratio would be 49:1 with unity coupling. With air-cored coils as described, the coupling coefficient was much less than one, but even so the impedance at the feeder was much higher than 50 ohms and the voltage also high, so that hand capacity at the tuning knob made tuning difficult. The simplest way to overcome this was to extend the shaft of the capacitor using the body of a ball-point pen. This tuning unit, as shown in fig 3, is simple and compact, but there would be wide variations in construction with other feeder lengths.

This antenna has been used for some months, mainly on CW. I have been unable to make direct comparisons with other types of antenna, but consider it to be the best simple antenna I have used. Its chief advantage would seem to be its low angle of radiation and its height, which puts it clear of obstructions. It has one disadvantage in that it picks up more noise than a horizontal type. ar

Tips and Tweaks for the Icom IC735

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THE FOLLOWING ARTICLE describes in detail some methods as used by the author.

Although this article has been written for owners of the IC735, other amateurs may find some useful information in the text or diagrams. The methods described, however, may not necessarily be the only approach.

1: Audio Filter

When a pair of headphones is being used with the IC735, it becomes very apparent that the level of noise (IC or transistor hiss) is unacceptably high. This noise is not only annoying, but affects the signal-to-noise ratio quite considerably, especially with weak signals. The circuit shown in Figure 1 will eliminate that problem and therefore improve the receiver functions considerably.

Not only is the audio signal cleaned up, but one can obtain full benefit of the pre-amp switch because the S/N ratio is improved and the pre-amp switch can be left off more often, thereby gaining all the benefits when the RF is fed straight into the mixer stage. Without the filter, one was tending to reach for the pre-amp to improve the S/N ratio.

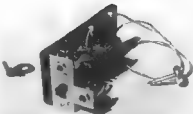
I have also found that some high impedance headphones can improve matters somewhat, as the noise is not so easily heard when these types are used.

The circuit in Figure 1 was arranged using a pair of ICOM HP2 headphones; these are 20ohm impedance. I have also tried a pair of Koss K/6x headphones, which have an impedance of 55ohm (in mono). Both types worked extremely well with the filter.

Filter Design

The circuit shown in Figure 1 is based on the principle of the 12dB per octave low-pass filter, as would be commonly found in loudspeaker cross-over networks. The values shown were arrived at by using trial and error.

Some other designs were also tried, 6dB and 18dB per octave slopes as an example, these proved to either do too little or too much, so the circuit shown in Figure 1 was the final choice, offering I

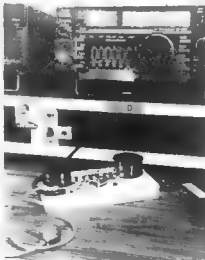


Completed headphone filter in final arrangement. Circuit is as Fig 1.

feel, the best overall compromise.

The inductor (L1) could be reduced in value if the junk box dictates, although the value of C1 would have to be suitably adjusted to compensate. To put that another way, other combinations of L1 and C1 together may well do the same job.

The capacitor (C1) should be of the highest quality. This is very important as low level definition will suffer otherwise. A Greencap capacitor rated at 250V worked extremely well compared with Bi-Polar, polypropylene, blue caps and plastic film types of the same value.



With the values of L1 and C1 used as specified, there is a *very slight* top cut-off of high frequencies on wide AM signals. The noise (IC hiss) is, however, reduced by a considerable amount, improving the signal-to-noise ratio substantially. This is most evident when listening to very weak SSB or CW stations.

Construction

The construction method chosen is shown in the photographs. The base is a small piece of particle board with a metal front for all the sockets etc. Because the inductor is an air core type it is sensitive to pick-up of hum and hash, so keep it away (at least 30cm (1ft)) from power supplies.

Figure 2 shows the dimensions of the inductor; 20m (65 feet) of 20SWG enamelled wire should be wound evenly on this bobbin to give the required value of 1.2 millihenries.

2: Volume Control

Is the volume control now hard to get at once the headphone jack is inserted into the rig? Then use a right-angle phone jack (I got mine from Tandy Electronics) and arrange it with the filter circuit. Two birds with one stone! I used a hacksaw to shorten the plug to be flush with sides of IC735.

3: CW Filter Installation

Although seeming to be in the "too hard basket", the job is actually basically straightforward and takes about 45 minutes. With everything disconnected, place the rig upside down on a soft sheet etc, the front facing you, then after disconnecting the RCA jumper wire at the rear, remove all the screws on the bottom lid.

The idea is to lift out the PCB, pivoting at the wires at the front of the rig. First remove all the screws holding down the PCB. (A magnetised Phillips head helps here) and disconnect all connections at the rear and sides of the board; be gentle when taking off the plugs (a small screwdriver as a lever may aid this operation). From memory, there are about six to eight leads and plugs to disconnect. Then

cut (be careful) the cable tie off the loom at the board just left of the CW filter location; this allows the board to now be carefully manipulated and lifted out, pivoting at the front and lifting up from the back. It is now a simple matter to install the filter, with the right sized soldering iron. Check the solder joints thoroughly and gently refit the PCB, making sure no wires are caught somewhere they shouldn't be, then connect all plugs. Fit in all the PCB screws but, before tightening, check that no wires are jammed underneath the board. Refit a new cable tie or secure where it was before, refit the lid and RCA jumper wire, turn the set over and check all functions.

4: Hum

My ICOM PS-55 power supply could be heard at more than 20 feet away when I first got it; the hum from the case was that bad. Luckily, it was a simple method to fix the problem by inserting a piece of sorbothane rubber between the top lid and the top of the transformer, along with tightening all screws, especially the four holding the transformer. Don't forget to disconnect the power plug first before you go inside.

Sorbothane pieces between shelves and large resonant areas such as tables etc can also reduce mechanical hum levels.

Addendum

Since writing this article it has been found beneficial to increase the capacitance value of C1 (in the headphone filter design) from 2.2uF to a total of 4.4uF.

Two 2.2uF 250V Greencaps, wired in parallel, do an excellent job if the maximum amount of internal receiver noise reduction is required.

Audio quality is only very slightly

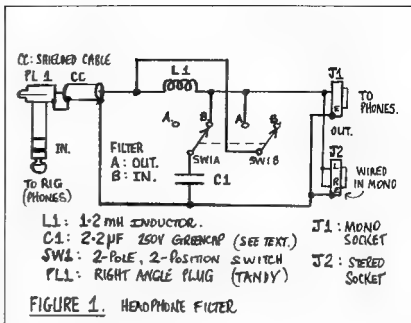
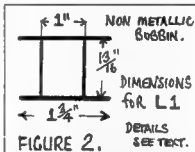


FIGURE 1. HEADPHONE FILTER



changed, and the value of inductor L1 will remain the same value of 1.2mH.

The ICOM PS55 Power Supply can be quietened down even further by adhering (under pressure) a strip of bituminous pad (approx 150mm x 50mm) to each internal surface of the sides of the lid. This can be done with clamps and soft wood to prevent scratching during the drying time; silicon rubber is the recommended adhesive.

Bituminous pads can be obtained from some motor accessory retail outlets as they are used for quietening down motor vehicle panels.

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WIA Award to VK6HD

One of Australia's top DXers has won the 1991 QSL Contributor to the WIA Collection Award. He is Mike Bazley VK6HD of Bedfordvale. Mike's generous contribution of rare DX, commemorative and rare prefix QSLs put him on top of the 1991 ladder. Another well-known West Australian, Robin VK6LK and Jim VK6NS of DXpedition fame filled the minor placings. Mike's main interests in radio are low-band DXing and CW. He was first licensed in 1950 as G3HDA, obtaining his present VK6 call in 1969.

He was the first VK to gain the WAS (USA) certificate on 160 metres, a fact confirmed by the ARRL. He uses an FT1000 and several antennas, including a 160m dipole, 80m sloping dipole, 40m two-el Yagi, 30m ground plane and a 20m three-el Yagi. He also has antennas for other amateur bands.

Mike was presented with an engraved medallion from the WIA (Vic Div) Council. Well done, Mike, and thanks for your help in building up a world-class QSL collection as a future record of one of the most popular aspects of amateur radio - DX.

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Murphy's Corner

On pp 11 and 12 of the April issue, the two diagrams which belong to Robert McGregor's VK3XZ FETs up Front technical correspondence on p21 of this issue, were also reproduced in Graeme McDiarmid's VK3NE article "Mobile Operations". Apologies to both authors for the mix-up.

The gremlins didn't take a holiday for the April issue. On page 5, Terry Clark VK2ALG popped from the list of WIA Accredited Examiners to also appear as the author of WIA News! Apologies to Terry for taking his name in vain.

FETs Up Front

ROBERT R. MCGREGOR VK3XZ 2 WILTSHIRE DRIVE SOMERVILLE 3912

MIKE MURPHY'S ARTICLE on FETs, AR May '91, was both timely and interesting. There are several other useful circuits to realise the benefits available by using FETs. FETs do not load their input sources, and allow a maximum realisation of the time and money spent in producing a decent tuned circuit. They are not power hungry and so make ideal voltage probes. The precise action of a receiving antenna!

Yes, you can live up valve receivers. One American company foresaw that changes to the then current microwave trunk networks across the USA would not be instantaneous. Geostationary satellites were almost science fiction and maybe there was a market for 10 million replacements for 6AK5 valves which were a hot VHF miniature valve. This was achieved with series connected FETs mounted on a valve base. See Fig 1. The lower FET drives the source of the upper one in a grounded gate mode. The basic circuit was used often with triodes in DC amplifiers for analogue computers, which are now on the way back. Fortunately there is no longer a need for a + and - 100 volts output, and a + and - 300 volt regulated supply which is costly, heavy and lethal.

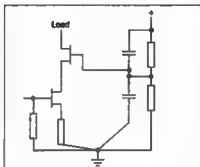


Figure 1

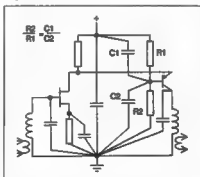


Figure 2

Another useful circuit originated in wideband IF strips. See Fig 2. Feedback was still the problem so the input to the stage, a transistor, had a common resistor load that drove a grounded base PNP transistor. This mode eliminates any feedback from a high impedance load in the collector circuit, thus permitting maximum gain and selectivity from tuned circuits. The circuit is equally at home with a FET driver driving a following FET stage.

Further variations with additional feedback paths are used in wideband inputs, eg CROs, voltmeters etc. Bypassing is important, and I have indicated the preferred common points in the circuits. Where there is a division of DC potential by two resistors to an active device, a transistor base, and it is desired to maintain it as an AC earth point, there is merit in bypassing the source and then in either direction from the point which it is desired to ground to the ends of the source bypass. If these two capacitors are in the same reactance ratio as the resistors they bypass, the results will be consistent over a wider frequency range. Reactance is proportional to $1/f$, so the capacitors are in the inverse ratio to the resistors they parallel. See Fig 2.

Wireless for Women

The radio set is an instrument which needs a woman's care. In the first place it needs a good position in the house, where it will be a pleasure to all and yet not be an obtrusive obstacle to be knocked against at every turn. If you have a large living room, the bow window is a good position in which to place the set. It is also a good place for the wires, which can be brought through the side of the window and attached to the set without being in anybody's way or looking unsightly.

In another direction the set needs a woman's care is to keep it bright and well polished, free from dust inside and out, for in the most carefully looked after house the dust will penetrate even into the inside of a closed piano or gramophone, so just the same with a wireless set.

(From Radio Broadcast of December / January 1925 / 6). Submitted by Colin Mackinnon VK2DYM

ar

Stolen Equipment

Stolen from Alan Gardner VK4BWG, 40 Wattle Avenue, Bribe Island 4507:

HF transceiver FT757 s/n 4E-071058. Power Supply FT700 s/n 3C-020584. VHF/HF FT209RH s/n 6E-260229. Power Supply NC15. FNB4 and FBA10 battery packs.

Stolen from Colin Luke VK5XY, 7 Loma Linda Grove, Wattle Park 5066:

HF SSB transceiver Yaesu FT7. Two Philips 1690 hi-band FM transceivers - one on commercial frequency of 165MHz, the other converted to 2m amateur band. FDK Multi 7 VHF/FM Xtal-controlled transceiver, with all channels fitted. Also SWR meter, digital multimeter and sundry plugs.

ar



Welcome to Mission Beach

(June 6-8 1992)

IAIN MORRISONVK4KIG PO Box 964 TOWNSVILLE 4810

IN 1982, A GROUP OF amateurs from Townsville and Cairns decided to meet for a camping weekend on the May Day long weekend. The venue for this was chosen to be central to both cities, and pleasant for family activities. Mission Beach is 200km north of Townsville, and 140km south of Cairns (1590km north of Brisbane) and a "tropical paradise". This initial foray was so successful that it has developed into a major social occasion in the calendar of north Queensland amateurs. Quite a few tourist amateurs have also turned up and met with us, after hearing about our meeting, and are always welcome.

Now the meet is held over the long weekend, when we Queenslanders celebrate the official Queen's Birthday with a public holiday. Traditionalists bring their tents of all shapes, sizes and complexity to pitch. One or two large, borrowed, coloured plastic "tarps" are erected as a central shelter and assembly area. There are no sides to this shelter so as to allow free access to the tables and chairs which

serve as dining, gaming, workbenches etc as the need arises.

There are cabins available on site (these need to be booked in advance) and, of course, lots of local motels, which some prefer to the tent city accommodation.

The central tarp site has 250V power, which is used for fridges, lights, lots of cuppas, charging batteries and even soldering irons(!) occasionally.

Many old and new friends may meet only on this one social occasion, interspersed with walks to the beach and other seaside activities. As this is the "cold season" for us northerners, not much swimming or sun loving is indulged in, but we do observe the tourists who think our winters are better than theirs!!

There is some radio operation, apart from the fox hunts and monitoring of two metres. This peaks on Sunday morning for the WIAQ news, and on Sunday evening at 8pm local time, for the north Queensland hook-up on 3604.4kHz, which is conducted from the campsite. These are rebroadcast on 2m, which prevents

overcrowding of the Tx area. Aerials are strung up, like a WICEN exercise, from anything high enough and near enough. The sight of fox hunters occurs at different times, and usually involves the searching of rubbish bins, washing machines, car boots, all looking for the diabolical hiding place.

One basic "organised" activity has become traditional: the "cricket match", which is played on the beach sometime after 1000 Sunday morning. For this, two teams, named "Townsville" and "Cairns", are involved, on a pitch paced out on the sand, hopefully with some semblance of stumps at each end! The rules are usually the subject of much discussion and negotiation on the previous night, and are quite flexible. Surrogate runners are allowed for those who want to bat, but cannot race down the pitch, and no one can go out for a duck. A maximum score of 25 runs per player is sometimes reached, forcing the batter into retirement. Basically the teams are Townsville versus combined Cairns and Tablelands

Clubs, with visitors being used to even up the sides where possible. This game runs for only a couple of hours, depending upon a lot of factors, and then a retreat is made to the campsite for sustenance. The scores are totted up, and adjusted using the formula negotiated the night before, and the winning team is announced.

As midday Sunday sees the greatest attendance, due to work commitments of some, a photograph session is usually held as soon as possible after the cricket match. This session brings out more cameras than a royal wedding, and in 1990 Jeanette Mann volunteered to learn how to operate them all in 15 minutes. It has been suggested that the faces in the group photos be identified, but so far this has been a daunting task, and is yet to be done. The photo above shows some of the crowd attending in 1990.

Sunday afternoon continues the chatter and technical discussions, with a lot of between napping occurring.

A barbecue is usually held on Sunday evening, for everybody, at a nominal charge. An old well-worn cricket bat serves as a trophy, and each year a small shield engraved with the winning team's name is affixed. As the occasion befits, the bat is either presented to the winning team or gloated over by the winners, depending on who won last time. The club presidents, or their reps make appropriate remarks into some very strange "microphones" looking like grapefruit stuck on a two-pin plug, or the bottom of a tomato sauce bottle.

The evening continues with singing and talking. If the moon is out, some stroll along the beach, and occasionally have a beach fire. Some would-be fishermen try their luck to find the fish amongst all the water.

Monday morning sees the tents being taken down and rolled up, and by lunchtime most are on their way, relying on their radios to keep contact for another year.

Addendum

This year the venue for this very social weekend has been changed to the Beach-Comber Coconut Village - at Mission Beach South. This is a large park, and has all the usual mod cons, and can be found immediately on the left as you approach South Mission Beach - where the waves meet the sandy part.

Camping and van sites, on-site vans and Melanesian cabins is the range of accommodation available, and should suit all families and purse-strings or sense of adventure! Please book early for the vans and cabins to avoid disappointment.

The Cairns Club has made the site booking for the tent city already, and is

keen to see us all turn up. The park is bordered by the beach and the rainforest - really lush green vegetation (a change for all the Townsville members!) and a cassowary was seen last year at the far end of the park when the inspection was made.

All operators, families and friends are welcome to come and see us - and stay awhile. There is always a cup of tea etc available for visitors, in return for the chatter and eyeball. The conversational subjects know no bounds, from trite to

technical wave equations(!!) with lots of laughs in between. If you would like to book or enquire further, please phone (070) 68 8129 (or fax (070) 68 8671). The park is listed in the RACQ accommodation guide also. Tell them you're with the amateur radio group too! For further details you can contact: The TARC Inc, PO Box 964, Townsville Qld 4810, or Iain Morrison VK4KIG, Packet VK4KIG@VK4AFS.#NQLD.AUS.OC, or phone (077) 21 3714 AH, (077) 78 6211 BH.

af



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Early Amateur Radio in Australia

COLIN MacKINNON VK2DYM, 52-54 MILLS RD, GLENHAVEN 2156

AS HAS BEEN NOTED in other articles, our first wireless experimenters were active from the late 1890s, and experimentation in Australia followed closely on developments in England, with information and help obtained via cable and from the wireless operators on ships coming from overseas. However, the government of the day decreed that the Royal Australian Navy was in charge of all wireless communications, and the Navy had the attitude that the only required application of wireless was for it to communicate with its own ships. The Navy was paranoid about anyone else having the ability to communicate by wireless. On the other hand, the commercial shipping lines, aided by the Marconi Company, demanded the unhindered right to contact their vessels. The Postmaster General already controlled the transmission of telegrams and messages via telegraph through the *Post and Telegraph Act of 1901*, and it too had a vested interest in the control of wireless because it could see it as a competitor to cables and telegraph just as had occurred with the Post Office in England. Following pressure on the government from commercial interests, the PMG and several amateur experimenters, the responsibility for wireless was delegated to the Postmaster-General's Department through the *Wireless Telegraphy Act 1906*. The Act allowed business wireless operation and did provide for the issue of permits to undertake experiments. The Postmaster General required applicants to prove that they had a valid requirement to carry out experiments which would advance the techniques of wireless. The exact wording is:

"... and the messages shall be transmitted and received for the purpose of conducting demonstrations in wireless telegraphy at public lectures or conducting experiments in wireless telegraphy and for no other purpose whatever."

The licence did not regulate power or wavelength, but the details that had to be furnished for the "appliances" included the power (ie voltage and current input), source of power, description of receiving appliances, and a curious requirement, the maximum range of signalling. The Navy retained technical control of the

airwaves and could make any station close down if it felt it could hinder Navy wireless traffic. These were the days of spark transmitters and it was quite easy to blot out several MHz. The licensee had to submit sketches of his appliances to the Naval Commander-in-Chief and explain their working to a Naval Officer appointed by the Naval CIG. He also had to submit any changes for approval, and nothing was to be withheld as confidential from the Naval representative. In an emergency the PMG had the right to take possession or control of any station, but did agree to pay the licensee for his time at normal rates of pay.

In this atmosphere of difficulty, if not repression, George Augustine Taylor called a meeting on 11 March 1910 at the Hotel Australia where a group of experimenters and interested people formed the *Institute of Wireless Telegraphy of Australia*. It aimed to bring together wireless experimenters for mutual co-operation and learning, and to protect their interests. To organise operating conditions for the Institute, a provisional committee was appointed, consisting of:

G A Taylor	Major Rosenthal
Major Fitzmaurice	Captain Cox-Taylor
Dr Brissenden	J H A Pike
W H Hannam	C P Bartholomew
W H Gosche	J Leverrier
H Leverrier	A Garnsey
F Cleary	

Many of these people distinguished themselves in wireless experimentation and the development of amateur and commercial radio in Australia. G A Taylor, in particular, led a very active life with interests in wireless, the Army Signals Reserve, flying, writing, painting, poetry and civil engineering.

Digressing a little, there was a problem between the Navy which regarded itself as the keeper of wireless, the PMG which didn't want competition to its telegraph landlines, and now the Army which could see tactical benefits from the use of wireless. The Army interest arose when Lieutenant G A Taylor, as a member of the Australian Intelligence Corps, along with Captain Cox-Taylor, Wal Hannam, Reg Wilkinson and a Mr Kirby, the last three being civilian members of the newly formed Institute, all participated in the first Army wireless transmissions from

Heathcote, south of Sydney on 28 March 1910. The distance covered was three miles between Army camps in what is now part of the Royal National Park. The PMG immediately complained that the Army had operated without a permit! The Army responded by saying it could do what it wished in the name of the national interest. Eventually, in April 1911, the Defence Department and the PMG agreed that the Army and Navy could set up any stations they wanted, but should preferably advise the PMG of the wavelengths etc and should try to avoid interference with commercial stations. Members of the forces who wished to experiment could submit applications through military channels to the PMG, and did not have to pay the £1 licence fee.

On 22 April the first General Meeting of the aforementioned Institute was held and officers were elected for the ensuing 12 months, as follows:

Hia Honour Dr Cullen	Patron
F Leverrier	President
Captain Cox-Taylor	Vice-President
G A Taylor	Vice-President
C E Stowe	Vice-President
C Huxtable	Vice-President
C Bartholomew	Councillor
R Wilkinson	Councillor
W H Gosche	Councillor
O U Vonwiller	Councillor
Dr Brissenden	Councillor
Captain Fitzmaurice	Councillor
W Spruson	Honorary Treasurer
W H Hannam	Honorary Secretary

The word Telegraphy was dropped from the Institute name shortly after.

One must remember that in those days there were very few telephones, mail was slow, and transport between cities was a major undertaking. Wireless communication was practical only over short distances, so even though wireless groups and clubs started up in several states, they mostly operated independently. Therefore, whilst the foresight of that first meeting in establishing a national institute was laudable, it was later found that other states had their own parochial organisations, and so the name of the NSW group was altered to the *Wireless Institute of New South Wales*. The Institute prospered and met on a monthly

basis. It was able to negotiate donations of test equipment such as a valve tester and a Marconi wave meter, a very necessary item for calibrating the operating frequency of members' equipment. One popular activity was a regular standard frequency transmission night which allowed listeners to calibrate their equipment.

It is interesting to note that according to a return submitted to Federal Parliament in October 1911 there were only 24 licensed experimenters in New South Wales, two in Victoria, two in South Australia and one in Tasmania (actually on King Island in Bass Strait). Two of that total were really commercial stations, so there were 27 licensed experimental stations. Others who may have been active at the time were therefore illegal and risked a £500 fine, which was a considerable amount in those days.

In Melbourne *The Amateur Wireless Society of Victoria* was formed on 30 November 1911, with the first general meeting on 13 December. Gradually the NSW Institute made contact with the other states, promoting the idea of a unified organisation and, in April 1913, the Victorian group changed its name to the *Wireless Institute of Victoria*. Other states had not advanced to the point of wanting a national affiliation before the outbreak of WWI on 5 August 1914.

In accordance with government regulations, all wireless equipment was interned for the duration of the war, except for an interesting exception in Western Australia. The PBS Radio Club had been formed at Perth Central Boys' School in 1913 and, at the outbreak of war, the members, mostly Boy Scouts, were sworn in for special military service locating undismantled wireless stations and checking reports of illegal signals. To carry out their duties the equipment was returned and they built other apparatus to aid direction finding, with the result that they were instrumental in the finding of 35 illegal stations. When equipment was surrendered throughout Australia in 1914, around 400 licensed stations were handed in, but another 208 unlicensed stations turned up!

The war officially ceased in November 1918, but the Navy, which had never been happy about losing its authority to control wireless communications in 1906, and had resumed control during the war, was most reluctant to allow any private experimentation. On the other hand, the numbers of amateurs had been swelled by ex-service signallers who retained an interest in wireless and wished to further experiment with the medium.

The resurgence of the Wireless Institute after WWI was detailed in a previ-

ous article, "The History of the WIA Journal" in AR January 1991, so is only briefly covered here.

On 7 January 1919, the Wireless Institute of NSW met for the first time since the war and discussed the difficulty members faced in re-commencing operation. A committee was established to attempt to get their wireless equipment back.

The first post-war meeting of amateurs in Queensland was on 19 March 1919, and they joined the Wireless Institute a little later. Melbourne amateurs formed the Wireless Institute of Victoria following a meeting on 1 April 1919, whilst on 11 September 1919, the Wireless Institute of South Australia had its first general meeting. On 3 November 1919, West Australian amateurs formed the Wireless Institute of Australia, WA Section, later changed to a state Division of the Wireless Institute of Australia.

One of the objectives which drew these groups together was the reactivation of amateur experiments. Despite pressure from AWA and intense lobbying by the Wireless Institute, the Navy was recalcitrant. It did give back the wireless apparatus in March 1919, but forbade any transmitting or receiving. Finally, in September 1919, Radio-Commander Creswell, who was the acting director, Radio Service, sent a letter to the WI of NSW stating that the Navy was willing to issue temporary permits to WIA members for experiments. However, the permit allowed wireless reception only, and valves could only be used if the member possessed a Morse qualification of not less than 12 words per minute for receiving, and a knowledge of the use and operation of valves. Take a moment to consider those restrictions - you had to be able to receive Morse code at 12wpm before you were even permitted to have a valve in your receiver; you could not transmit at all and, to top it off, the permit was temporary! What would those who argue against Morse code say to that? Commander Creswell outlined in his letter special circumstances for the issue of a transmitting permit. Transmitters were limited to 100 watts input and kept below 250 metres. Despite appearing to make concessions, the Navy made it very difficult to obtain any permits, and very few were issued between 1919 and 1922.

The Act was revised in 1919 to become the *Wireless Telegraphy Act 1905-1919*, and many of the statutory rules that had been issued since 1906 were updated in light of the developments in technology. However, the requirements for amateurs were even more draconian than before. For instance, applicants for the "experimental and instructional licence" had to

be natural-born British subjects, had to set out "the scientific, technical, practical or other grounds upon which it is desired to obtain a licence" and had to produce "satisfactory proof of his competence to conduct experiments scientifically ... for the advancement of science and for no other purpose whatever." If he was lucky enough to be granted a licence he could not alter any of the appliances without written permission from the Minister or an authorised officer. If the PMG claimed its telegraph lines had been damaged, interrupted or interference caused by an experimenter, the licensee was liable for all costs to restore or re-route the system. As if to rub it in, the fee for an experimental licence was £2, whilst a ship licence was only £1. Today's "black box" operators who can only "ragchew" would have had a problem back then!

In mid-1920 the Postmaster General took over the licensing arrangements again, but it was still not easy to get a transmitting permit, and in the period from September 1919 to December 1922, the only stations with legal transmitters were associated with the Wireless Institute.

On 1 December 1922, new wireless regulations came into force, allowing amateurs the wavebands of 150-250 metres for all classes of transmission, and 410-440 metres for wireless telephony and CW only. Stations within five miles of a defence or commercial station were limited to 10 watts CW, MCW or telephony (no spark transmitters allowed). Up to 50 miles, all transmitters were allowed but only 20 watts, and the aerial had to be tuned. Outside 50 miles, any type of transmitter up to 250 watts was permitted. Applicants now had to sit for an exam, if required by the controller of wireless, at a cost of 5/-. Receiving licences were reduced to 10/-, and transmitting and receiving licences dropped to £1. Applicants wanting permission to use a valve receiver had to produce a certificate from a wireless club or a postmaster, showing they could receive Morse at 12wpm. Other previous restrictions still applied. The new regulations also included tentative rules for proposed broadcasting and licences for broadcasters and dealers.

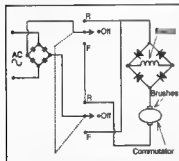
By December 1924 there were only 90 transmitting licences issued throughout Australia, according to official PMG records. That raised an interesting point, because it seems there are hundreds of old timers who claim to have had transmitting licences before 1924.

Prior to 1916, amateurs had been free to communicate on any wavelength with each other and with operators on merchant ships (and Navy ships prior to

1905). These ship's radio men were a great source of hard-to-get parts, perhaps at the expense of the ship's spare parts store. However, now with the new regulations of 1922, the transmitting amateurs were restricted to set wavebands well away from commercial and Navy frequencies, so they could talk only (telephony was becoming popular now) amongst themselves. Some others began to broadcast to the growing group of amateurs who had listening licences only. Programs of music, poetry and book readings were popular, and the operator would often give his name and maybe a phone number and ask for listeners' reports. I am not sure how this qualified as serious experiment to advance science. Another interest was DX and it was a time when genuine experimenters made great advances in distant contact, redesigning aerials, improving transmitters and developing better receiving apparatus. Regular overseas contacts became possible, and links were built between Australian amateurs and those in other countries.

Just as amateurs were distinguishing themselves in an increasingly popular hobby, progress was about to create a new set of problems - or opportunities. Nineteen-twenty-three marked a change in the whole wireless scene, because in that year commercial broadcasting was introduced in Australia. It brought dramatic changes in the role and perception of amateurs and also provides a convenient point to interrupt this narrative. ar

TRY THIS



Two-wire method of reversing series motor.

Tech Editor's Note: The diodes must handle the stalled current of the motor. For small motors, 35amp encapsulated bridges would be suitable and economical.

Submitted by Les Daniels VK2AXZ
9 Highfield Terrace
Cardiff Heights 2285

International ARDF

WALLY WATKINS VK4DO PO Box 262 AIRLIE BEACH 4802

OVER THE YEARS there has been close co-operation between member societies of the IARU Region III at administrative level. However, the amateur to amateur contact has not been developed as a national initiative. This is now changing.

The Townsville Amateur Radio Club (TARC) established a sister club relationship with BY4RSA, the club station of the Jiangsu Province branch of the Chinese Radio Sports Association (CRSA) in 1990. As a result of this initiative, the Jiangsu Province Sport and Physical Culture Commission invited the TARC to send a team to compete in its August 1991 provincial Amateur Radio Direction Finding (ARDF) contest in Nanjing.

The team consisted of Ken VK4QZ, Ray VK4LU, Ron VK4BRG and Wally VK4DO (leader). This is the first time an Australian team has competed overseas under international rules. Prior to leaving Australia, arrangements were made to have lessons before the contest. These lessons were given by Mr Miao over four consecutive mornings. Subjects covered were the international rules of ARDF, how to use 80m and 2m equipment and, finally, field practice.

The principal organisers of the contest were Yan Xie Nan, secretary general of Jiangsu Branch CRSA, and Chen Fang BZ4RC, station manager of BY4RSA. The Australian team was able to stay in the guest house of the Sports Commission and to keep in close touch with various people involved in the running of the contest.

The official interpreters were Miss Li, a most pleasant young lady, and Kang BZ4SAA, an ardent 6m operator from Suzhou City.

The 80m contest was held under appalling conditions. One hundred and fifty millimetres of rain fell during the day. To say the least, it was unpleasant! Day two was fine for the 2m event, and more enjoyable. The TARC team achieved, in the senior class, a silver medal in the 80m (VK4LU) and, in the 2m, two gold (VK4QZ and VK4DO, equal) and a bronze (VK4BRG).

What is so different about international ARDF compared with the Australia-New Zealand type of fox hunting?

International ARDF is based more on conventional orienteering than the An-



Ray VK4LU and Ron VK4BRG in Chinese wet-weather gear in 80m event.

zac norm. It is, in fact, a footrace in which the contestants must, after leaving the start line, find and record on their card the required number of transmitters found, and proceed to the finish line. Times are taken to the nearest second.

There are four classes: YL no age limits, JN males under 17, OM males 17 and under 40 and OT (seniors) 40 years and over.

The starting sequence is drawn up by the chief judge, and one contestant from each class starts at the same time. These groups leave at five-minute intervals.

The hidden transmitters (five) all transmit on the same frequency for one minute sequentially and send their call sign in CW. Callsigns are MOE, MOI, MOS, MOH and MO5. A beacon transmitter MO at the finish line is on an adjacent frequency and transmits continuously. Output power of the transmitters is five watts or less. A red and white board is close to the transmitters and a unique punch is attached for marking the scorecard by the competitors. Umpires are hidden near transmitters to make sure there are no breaches of the rules. The course is generally over a distance of 5-

7km. The contestants must supply a receiver, antenna, compass and writing material.

JARL has put forward a uniform ARDF rule proposal for use in Region III. This is hoped to be a stimulus for more Region III ARDF activity both regionally and between adjacent societies.

Information is given out at the starting point as the time limit for the contest, a map of the area with the start and finish shown, the starting time for each contestant, together with a numbered vest to wear. All receivers are impounded and given out only five minutes before each starting time. They cannot be activated until the end of the starting corridor is reached. The transmitters may be found in any order.

Most of the competitors at Nanjing were from primary and middle schools. They were fit and could be seen running everywhere. The TARC team tried, unsuccessfully, to get the rules changed for the OT class so that running was not allowed! There were more than 200 competitors taking part, but the excellent organisation allowed everything to run smoothly.

The transmitters and timing gear are commercially made, rugged and waterproof. Receivers are of varying designs, a lot being home-made. The TARC team was supplied with commercial Chinese receivers for both events. These were subsequently given to the team for future use in Australia.

From the experience of the TARC team it is readily apparent that any team from Australia must be physically fit and very familiar with its equipment.

Having said that, and looking around our ageing amateur population, it can be seen that problems may arise in this area in the future. On a number of occasions letters in *Amateur Radio* magazine have noted that we must attract more young people into amateur radio. This sport could be an ideal vehicle to achieve this end. If ARDF is promoted in secondary schools, through the physics classes, it may well be possible to attract young people to it and later into amateur radio. Encouraging them to build simple receivers for ARDF may turn out to be the catalyst for further interest in amateur radio. A pilot scheme will be investigated to see if schools are interested in participating.

International ARDF will not replace the traditional Australian mobile fox hunting or the pedestrian sniffer hunt, but will add another dimension to amateur radio activities within Australia and Region III.

Further details can be supplied to interested groups or individuals. ar

江苏省无线电运动协会 Jiangsu Radio Sports Association

无线电测向友谊赛
Fox hunting friendly competition

澳大利亚 VK4WIT 俱乐部
Australia Club

运动员名单(男子老年组)

Names List (Senior Group)

澳大利亚队:	154	罗恩·格莱汉姆	1938年5月14日生
Australian Team		RON GRAHAM	
	155	瑞尔·亨克斯	1934年6月30日生
		RAY HINKS	
	156	凯恩·卡西迪	1937年10月13日生
		KEN CASSIDY	
	157	华莱·华特金斯	1928年1月1日生
		WALLY WATKINS	
江苏队:	151	姜益农	1939年生
Jiangsu Team		Jiang Shengnong	
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		Chang Wenlong	

Morseword No 62

Solution Page 56

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Across:

- red dog
- group of six
- certain
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- part of eye
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- hairdo
- mock
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Down:

- stitches
- boss
- begin
- preserve
- vehicle
- review
- namely (Latin)
- tarts
- horn sound
- genuine

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Bulgarian Visitors

DEREK THURGOOD VK3DD PO BOX 234 YARRA GLEN 3775

DURING OCTOBER I received a telephone call from Ken VK3MBD asking whether I would be interested in an international visitor visiting my club (Healesville Amateur Radio Group). This question was asked knowing that HARG likes to have visitors and often arranges guest speakers on club nights.

Of course, being a keen DXer, I was not averse to meeting radio amateurs from around the world – earlier in the year I spent some time with Bill KJ6EO from Los Angeles who was in Melbourne on business – and the club agreed to invite Pavel LZ3TU and Vasil LZ3VD to visit us at Healesville on 6 November.

Pavel and Vasil are airline pilots and were in Melbourne undertaking a transition course of training on 767s (planes, not radios!) Their time was very hard to pin down due to flight simulator training and the result was that on 13 November Pavel visited Healesville Amateur Radio Group. Vasil was on the flight simulator at Tullamarine until 0100 (local) and, unfortunately, could not attend.

The visit to HARG by Pavel was simply to meet and get to know a few amateurs and to help break the training routine at the airport. Pavel did, however, agree to give a talk about his work as an airline pilot and tell us a little about amateur radio in Bulgaria.

About 25 members attended the HARG meeting and listened attentively to Pavel's talk. There was also quite a lot of opportunity for individual discussion during the evening. The evening was enjoyed by all present especially Pavel who really enjoyed meeting VK hams.

During the talk, Pavel left some magazines issued by Balkan Airlines, which gave an insight into the tourist aspects of Bulgaria – quite nice beaches, hotels etc (and very clean looking cities).

Many thanks to Ken VK3MBD for driving Pavel to the club.

On being given a HARG QSL card (which has a caricature of a platypus on it) Pavel showed interest in Australian native animals.

I asked him if he and Vasil would like to visit the Healesville Sanctuary and see our native animals first-hand. He responded immediately that if they could arrange a suitable time away from their

training they would love to do so.

After a couple of false starts, arrangements were made for myself and Lynn VK3DKE and our XYLs to take Pavel and Vasil to the Sanctuary. However, again Vasil could not attend as he was to fly home on 1 December, the date arranged for the visit.

Lynn and I did manage to meet Vasil when we drove into Melbourne to pick up Pavel. Vasil was disappointed at not getting to the club or the sanctuary, but he was glad to be flying out to home and family (informal skeds have been arranged – informal because pilots' rosters are not necessarily going to keep track of good propagation!).

We left Pavel's motel at about 1000 and drove back to my QTH at Yarra Glen where we picked up my XYL Roma, Lynn's XYL Jenny and a "goodly selection of picnic ingredients".

Arriving at Healesville Sanctuary at about 1200 we decided to have our picnic before entering (don't have to carry Easies and flasks). At this point Pavel produced an interesting bottle of Bulgarian red wine (available in Australia) which, after some discussion, was put back in the Eskey (Lynn and I may open it for Christmas).

The walk around the Sanctuary was

slow and became even slower when we arrived at the platypus enclosure where Pavel stood fascinated by this animal (monotreme) that many of us take for granted. He eventually was drawn away with the promise of being able to touch and feed a kangaroo and see a number of koalas. It turned out to be a very friendly wallaby that Pavel patted and, when it licked his hand, he called for photographs.

When we finally left the Sanctuary we went back to Yarra Glen and spent some time in my shack "just talking" (easy for amateurs!).

All too soon it was time to take Pavel back to his motel for more study.

Pavel got through his training okay and, on Saturday 7 December, flew out of Melbourne heading for XYL and children in Sophia, Bulgaria. Again, "informal" skeds arranged.

If any amateur reading this ever has the opportunity to spend time with a fellow amateur from "across the world" I heartily recommend you take it up. It is enjoyable and educational (from the perspective of both parties) and helps to bridge the gap that we amateurs (most of us, anyway) only ever realise "on air".

Hopefully we will meet Pavel again on air, perhaps signing as LZ3TU/AM!

ar



Pavel LZ3TU pictured at the Healesville Sanctuary. Photo by Derek VK3DD.

A Mother of A Storm

(Or Why The Quad Isn't There Any More)

BARRIE GILLINGS VK2DWC 121 BANNOCKBURN RD, TURRAMURRA 2074

The Antenna Farm

THE ANTENNA FARM at the home QTH is not what the true enthusiast would call extensive.

It's quite modest really, just a TH3 Junior, a home brew tri-band spider-type cubical quad and a G5RV, plus, of course, the TV antenna.

The TH3 was tastefully mounted atop a length of galvanised water pipe which sticks out, (a long way out) of the now disused laundry chimney. The quad was mounted on a home brew tilting tower, again of galvanised water pipe. It is not guyed, but does not stand proud and alone. It gains support from a large cedar (the cedar of Lebanon, *Cedrus deodora*). In the OM's opinion, the quad adds considerably to the aesthetic appearance of the tree, a view not shared by the XYL. Refer to Figure 1 and draw your own conclusion. The G5RV is strung between a tall jacaranda (*Jacaranda mimosifolia*) and a much taller lemon scented gum (*Eucalyptus citriodora*). There is no photograph of the G5RV. If you've seen one, you've seen them all.

By careful selection from a prized hoard of useful items, referred to by the XYL as junk, the OM fitted the TH3 with an Armstrong rotator of, in his unbiased opinion, astonishing efficiency (45 degrees per second) but denigrated by the XYL because of the creaking noises the bicycle chain, used roller bearings and paintbrush handle brake make during high winds.

The quad has a conventional rotator, and for those readers unfamiliar with spider construction, looks exactly like two anorexic Hill's Hoists, joined at their tops, and turned sideways (Figure 1). It uses spreaders of aluminium tube and broomsticks, and 1/8 inch aluminium wire, lots of it. It is, to the OM, an imposing structure, but the XYL refers to it as a monstrosity. It has a lot of windage, an undesirable quality in an antenna.

The G5RV is of hard drawn copper wire, fed by a ladder line cut to the appropriate length. The OM and XYL agree that it is unobtrusive, except for the orange coloured polypropylene guy rope. It has practically no windage at all, and because of a cunningly inserted coil spring, does not stretch of break when

the supporting trees bend out of phase in the wind.

Pros and Cons

Operators living in elevated locations may bless the accompanying good propagation, but they must also accept the disadvantages. These are two: i) wind damage and ii) lightning strikes. Operators who live in deep ravines and curse their misfortune may be mollified by the information that in the last three years at this QTH the TH3 has been blown over twice, the quad three times and that the G5RV has been struck once by lightning (see AR Vol 57 No 10 November 1989). Antennas cannot be struck by lightning more than once, because the first strike metamorphoses them into metal vapour and/or scrap.

Thus the G5RV now in situ is a complete replacement of the original G5RV. It's getting to be a bit like Paddy's axe, which readers may recall has had two new heads and three new handles.

The Gould League of Antenna Sufferers

There are, of course, other natural phenomena which cause problems for antennas. The common ones at this QTH are Magpies (*Gymnorhina tibicen*) and Currawongs (*Strepera fuliginosa*), who delight in perching on the TH3 elements in groups, invariably on one side only, and rotate them out of alignment by sheer weight of numbers. A handy hint: pin the elements with bolts right through the boom before erection. Alternatively, you can grow giant bamboo (*Bambusa vulgaris*) in the garden, and use a long length of it to poke the elements back into position, but this can get tedious after a while. Another alternative might be to train the birds to distribute themselves evenly either side of each element, but this would definitely be a long term project. It might be simpler to acquire a shotgun or a pet wedge-tailed eagle.

A more challenging avian problem is the Sulphur Crested Cockatoo (*Cacatua galerita*). Our local representatives of this group travel in large flocks, and delight in undoing or biting through the cords which hold the cubical quad in its right and proper, aesthetic and efficient shape. Braided nylon cord and liberal

applications of silicone sealant on the knots slows them down a bit, but may not defeat them. But do not use plastic insulators. Your average cockatoo regards these as some novel type of nut, and dismembers them with ridiculous ease. They have trained themselves to perfection on the nearby Queensland nut tree (*Macadamia tetraphylla*). This OM was forced to replace all 24 insulators on the quad with porcelain, but it was worth the trouble and expense and is the definitive solution. One can gloat when the puzzled birds try, unsuccessfully, to crack the hardest nut they have ever encountered and almost hear them saying 'with a shell this hard, it's got to be delicious'.

WX Hazards

The first time the TH3 was blown over, a very strong westerly wind was responsible. These occur regularly in the winter months on the east coast of Australia. They are so common that the WX authorities have a pet name for them: 'Winter Westerlies'. This one, in 1989, was a ripper. It bent the mast at right angles, but the TH3 was recovered, relatively undamaged. The quad did not fare so well. It required a complete rebuild, but its mast, supported by the deodar, remained straight and true.

The next big blow was the freak wind-storm of August 3 1990, a true 'Southernly Buster'. By then the OM had provided the TH3 with a prophylactic reinforcement of three steel cable guys and had no problems.

The quad, alas, was completely demolished, again. GIO insurance, by this time somewhat perturbed at the ephemeral nature of the quad, demanded full details of the event, which the WX personnel ((02) 269 8555), were able to provide 'off the cuff', without referring to the records, this being their most popular weather event enquiry for the year.

The lightning strike of 9 December 1989 which disintegrated the G5RV, bears mentioning because the supporting trees didn't even lose a twig, nor the roof a tile. So it was that in the AR article (see above) the G5RV was called a 'sacrificial dipole', as it saved the trees and QTH itself from damage. Alas, it could not protect against storm damage, as the following will describe.



Figure 1 The three band spider quad. Spreaders are aluminium tube and 25mm dowels. The mast is galvanised water pipe, and tied to the top of the deodar tree. Wire is 3mm aluminium and tensioning ropes are braided venetian blind cord. Full construction details are available from the author.



Figure 2 The cubical quad in dismembered condition. The OM decided against re-erecting it for the third time.

The QUB' and Met Report

On Sunday 20 January 1991, there was a trough over western Victoria and NSW which resulted in hot, relatively dry air over the eastern part of NSW. The weather in western Sydney was hot, around 35°C. On the coast, and in the northern suburbs, it was a bit cooler, because of the sea breezes. But there wasn't much moisture in the air, and thus not much vertical air movement. The situation was described as unstable. On Sunday afternoon a mild southerly change came in from the south, bringing with it cool, moist air. This exacerbated the instability. The trough moved slowly eastwards.

By Monday morning 21 January, the southerly change had raised the moisture content of the lower air, which was now confined by an inversion layer at 1,500 metres. By lunchtime the trough had deepened because of cold air approaching from the south at around 6,000 metres. The trough continued to move eastwards. The inversion layer now started to break up, causing great instability. Higher level winds from various directions developed, and these injected into the system additional quantities of moist air. The scene was now set for a rapid and catastrophic denouement.

By mid afternoon, WX authorities had identified a severe storm approaching Sydney from the south west. It was multicellular, with many individual localised thunderstorms forming and decaying. The most active part moved through Camden, then along the high ground through the Hills district, Warrawee, Turrumurra, St Ives, Terrey Hills, Duffy's Forest, then past Barrenjoey

headland and out to sea, in an irregular swathe 30 kilometres long and three kilometres wide.

At the height of the storm, Camden and Bankstown airports recorded winds of around 100 kph. Turrumurra and Barrenjoey windspeed recorders registered around 130 kph before stripping their gears and failing. The individual storm cells moved together in a north easterly direction at about 60 kph, but the associated winds came mainly from the south, providing thereby a nice demonstration of the Coriolis force.

However, extremely strong downdrafts at the foot of the storm cell fronts came from various directions, often in rapid succession. It wasn't a tornado, with a typical tornado 'eye', but to some unfortunate observers the wind shifts must have made it appear so. It certainly behaved like a tornado, but it was a localised storm, a Mother of a storm!

Now strong winds can cause considerable damage, and are not nice things to have around the house.

The problem here was that the strong winds were accompanied by rain, masses of it. At this QTH, the Christmas gift 'Nylex Official Rain Gauge' recorded 70 millimetres in about 25 minutes. For the older reader, that is the equivalent of about an inch of rain every eight minutes.

I say 'equivalent', because this rain had lots of hard bits in it, in the form of large hailstones, some of which broke the sides of the gauge's collector funnel, so the actual 'precipitation' was probably more than 70mm. It rained, as they say, 'cats and dogs', enough to start an RSPCA animal refuge.

Local Effects

That is the cold, unemotional, scientific explanation of the events of 21 January 1991. What follows is a personal account, which starts with the OM taking an early mark from the Saltmines, it being off season for dentistry students at the Westmead Hospital Dental Clinical School. He drove out of the hospital parking lot at about 1530 hrs (local time) and noticed dark clouds to the south. Not to worry, he was going north east and there the sky was blue. A swim in the home pool would be nice. He turned on the car radio, and deduced that the antenna connection must have failed again because all he could hear was massive QRN. One expects these little problems with an 1972 vehicle. He did not realise at the time that the QRN was real rather than illusory, and was a dramatic demonstration of the RF component of continuous, monumental lightning activity.

He stopped near the home QTH to get some fuel, and have an eyeball QSO with the garage proprietor. The sky to the south west was now unnerving. Low down on the horizon it was bright yellow, in a narrow band. Above that was a band of apple green, and above that the green became darker and darker, and at 45° it was charcoal grey, shading into black almost overhead. The garage man, who seemed to know all about such things, said knowingly: 'That dark green means hail. You'd better get your car under cover to avoid the golf ball effect.' The OM departed forthwith.

Tempting fate, he stopped at the local shopping centre for some sausages. Fortified with his newly acquired knowledge, he adopted the pose of an expert,

and QSP'd the butcher that dark green clouds mean hail, and that he should protect his big south facing plate glass window. Neither the OM nor the butcher had any idea how this could be achieved in the 15 minutes remaining to zero hour. But the thought was there.

Arriving home, the OM found the XYL also home early from the Saltmines. She was having a ragchew with the visiting YL harmonic. The latter's car was parked in the street. Adopting a dramatic tone, the OM issued urgent instructions to move it into the carport to avoid hail damage, as the clouds were dark green, and this always meant hail. The YL harmonic did so, suitably amazed at the OM's omniscience.

The OM then QSP'd the XYL that dark green clouds signify hail, and all south facing windows should be closed forthwith. The QTH has 24 of them. He did not notice at the time that the dog, who hates thunderstorms and can somehow detect them when they are miles away, was already under the piano stool, the location in the house which is furthest from all the windows. He had closed the last of the windows and was QRV for anything when he noticed that someone was throwing ping pong balls into the swimming pool. No, the splashes are too big, they must be golf balls. Surely they can't be hail. But they were!

Two minutes later, at 0637 UTC (1637 hrs local summer time) the wind, rain and hail all struck at once. About five minutes later, it was clear that this was no ordinary storm. We were shouting to make ourselves heard. Perhaps the communication difficulty was why we were all gathered at the piano, where the dog was still under the piano stool. An alternative and more likely explanation is that we were all as terrified as the dog and positioned ourselves as far from the windows as possible.

Then the bedroom door blew open, apparently against the wind. How could this happen? A quick peek into the bedroom provided a clue. The hail had blown out not only the south facing windows, but also the east facing windows, and this created a suction effect. This conclusion was later supported by hard evidence. Pillows from the bed were found the next day 50 metres away, in the neighbour's front yard.

Against the XYL's pleading, the OM braved the elements and broken glass, (admittedly during a lull in the tempest, as he is really a devout coward) and managed to move the two mobile bookcases and a television set to drier ground. By now the troops had become somewhat injured to the noise and devastation, and were making sporadic efforts at damage

control. Severe leaks had developed in three areas of the lounge and dining rooms, threatening the parquet, and bucket and mop details were appointed. We all benefited from having something to do, as it kept our minds off the dramas unfolding around us. The rest is a blur.

In 30 minutes it was all over, and not long after that, the sun came out again. Now was the time to take stock, and assess the damage. It was not, as they say, a pretty sight.

Checking for Damage

In situations like this, the most important areas should always be checked first. On previous occasions of heavy rainfall, water has been known to seep down the mast, into the chimney and so on to the equipment in the shack. This time the situation was more serious. Both windows were broken, and there was a layer of hail several centimetres deep on the operating table. This is fine if you want a gin and tonic, but is inimical to comfortable or indeed safe operating. Also eight roof tiles were missing, and blue sky was visible because the ceiling had fallen down.

In order of priority, the next items checked were, of course, the antennas. The mast of the TH3 had been bent at 60 degrees, and the antenna itself was resting on the roof, but from the ground did not appear to be seriously damaged. The OM established this beyond doubt by climbing on to the roof.

While he was there he took the opportunity to replace the roof tiles. This task was made not a little dangerous by the broken glass of the solar heating panels which had relocated themselves in the street. The spider hub of the quad had left the mast, and was suspended in the jacaranda. The spreaders were either broken or bent, and all tangled up, together with the braided nylon guys, in the branches of various trees, as were the wire elements (see Figure 2). The supporting bracket of the rotator casting was later found to have been snapped off at the motor housing. Strange, that, it looked strong enough to moor a Manly ferry in the shop. Come to think of it, it probably was. The jacaranda end of the G5RV was intact, but at the lemon scented gum end we had a problem. The 80 foot (24 metre) tree was now a 40 foot (12 metre) tree. A secondary problem was that the broken bit was still in situ, albeit 180 degrees out of phase, and everyone kept well away in case it fell. It eventually did, two days later, narrowly missing an SES worker (see Figure 3).

Having the YL harmonic move her car into the carport was, in retrospect, a mixed blessing. The good news was that

its erstwhile street location was now occupied by a huge tree trunk. The bad news was that although the carport had provided the anticipated protection against hail damage, it had collapsed onto the car.

Collateral Damage

There was some other damage. All fourteen solar heating panels were damaged and BER (Beyond Economical Repair) and eight had relocated from the roof to the street. Eighteen windows had been blown out, and all the associated curtains were shredded. All the plastic guttering was perforated, with a hole about every ten centimetres. Three ceilings were buckling under the weight of water.

The back fence was on its side and most of the twenty or so fruit trees had lost their south facing bark. The pool was full of broken glass, leaves and branches, but here was a bright note. It didn't need topping up. In fact it was overflowing. Apart from this, the collateral damage was slight. The neighbourhood had a bit of greenery to be collected though, 60,000 truckloads of it. Several neighbours also suffered damage. This would have included the occasional radio antenna. The total insurance bill for the storm was \$185,881,095, being made up of



Figure 3 The 12 metre '180° out of phase' section of the 24 metre lemon scented gum, which fell later. The XYL and dog are in the foreground. Directly behind her is the YL harmonic's car, under the collapsed carport. They are obscured by fallen branches.

\$142,033,275 for 37,339 house and contents claims, \$22,428,864 for 2925 commercial claims, \$21,419,557 for 4208 motor vehicle claims. There was, incredibly, no loss of life.

QRO to QRP

There was no electrical power at all in the area. Anticipating that it was unlikely to be restored for perhaps a week, the OM avoided the embarrassment of missing his skeds by purchasing, the following day, a Honda 2kVA generator which ran faultlessly and almost continuously for the six days that we were without mains power.

It operated the rigs just fine. The XYL got a bit stropy about the refrigerator and freezer, and the OM obliged by powering these up, and the television set, from time to time. That's how we do things at our QTH. Share and share alike. It's the only way.

A comprehensive booklet describing the event, and the sterling efforts by many organisations to restore the area is available from the Ku-ring-gai Municipal Council. All those involved in the activities deserve the highest praise.

QUM!

So, what does this event teach us? The lesson is clear. Cubical quad antennas are unsuitable for high winds areas, and if any reader would like a second hand spider hub, slightly damaged, at no charge, please contact the author. No, the 1/8 aluminium wire is not included. Most of it has now been converted into a large discone antenna. The XYL prefers it to the 'Hills Hoist'. She says it looks like an Asian Coolie hat, and thinks it's quite decorative. The TH3 and the G5RV are now back in operation. When the time is right, the OM might, diplomatically of course, open negotiations about a vertical.

The above, dear reader, explains why that famous local landmark, the cubical quad, isn't there any more.

PS The butcher's plate glass window survived, but his roof lifted six inches. The garage man's roof sagged by an equal amount, owing to a surfeit of hail.

PPS The local boy scouts will be selling garden mulch made from the debris for decades to come. It's an ill wind that blows nobody any good!

PPPS At the insistence of the XYL and at great expense to the management, all south facing windows at the QTH are now 6mm laminated glass.

Notes:

1 QUB The WX at.....

2 QUM Normal working may be resumed (following distress traffic).

ar

Exercise

H KARL SAVILLE VK5AHK 2/1290 NORTH EAST RD, TEA TREE GULCH 5091

There was only part 4, and final episode of the Stephen Frith Story to be printed out. The draft was already in my trusty Microbes, but the printer tape was too worn, and the resulting copy would have been too faint for the typesetters of *Amateur Radio*, so I decided that I would pop along to the little computer shop, which is about 500 metres down the road, and get a replacement tape.

I am getting on in years and I have put on some weight recently, possibly because I dislike exercise, and also because I eat too much. However I finally fell for the repeated advice given by the medical profession and the various fitness organisations that one should exercise every day. I must admit that when I look into the wife's dress-making mirror and compare my figure with the huge chested and small waisted models, of both sexes, I can see a difference and maybe I should exercise more and regain my youthful figure. So instead of taking the car, I decided to walk down to the computer shop.

It was a very hot day and I put on my saucy wide brim hat, with the little feather in the hat band, to shade off the cancerous spots, and I felt ready to brave the 500 metre stretch.

I had covered about 400 metres and I must admit that the walk was good. I was passing the Commonwealth Bank with its new sign prominently displayed, and wondering what the connection was, when I stumbled. I was wearing glasses, and I find that the rim of the glasses somehow shields the view down at the feet, unless of course you tilt your head downwards. I was deep in thought and had not seen the bump in the bitumen path which had been raised by a large root from a nearby tree. I am a big man and not nearly so agile as I used to be, but fortunately I had the presence of mind to roll as I hit the deck. This still did not prevent me from hurting myself, but the rolling action must have looked peculiar to a fellow at the automatic teller machine, outside the bank. He turned round, on hearing my glasses, printer tape and hat go flying in all directions, and the look on his face seemed to give me the impression that he thought I was drunk. He certainly did not offer to help this poor old man in his moment of need. I staggered up, there were no broken bones as far as I could tell, although I felt awful, bruised, shaken and bloody. I managed

to get to the computer shop, which was close-by, only to find a notice on the window saying that the shop was closed for the day owing to illness. Just my luck!

So I started off home, without a new printer tape, and on the way I called in to see our doctor, to check me over. The doctor is a very nice chap, the wife and I like him very much, but while we trust him in matters of family medical advice, his expertise in nursing isn't of the same high standard. In fact, I gained the opinion that I was his first accident case. He put a very large bulky bandage on my arm, he had a lot of difficulty in bandaging up my thumb, the huge bandage on my knee prevented my trousers from being pulled down, and with greater difficulty he managed to bandage my shoulder. After a tetanus injection, I staggered home desperately trying to keep the bandages from falling off me.

My daughter's car was in the driveway when I arrived home and when she and Doris saw me enter, looking more like a mummy from Tut's tomb than the handsome old gentleman who left the house earlier, you can imagine the consternation it caused.

I am more than ever convinced that exercise is not good for you. I have managed all these years without it, and so I am going to see how long I can really manage without it. I will not look in the wife's mirror again!

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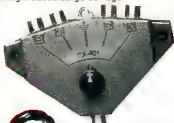
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embodies many of the advanced features and ease of operation of the FT-1000. But in a more compact, economical package that sports several new advances in both transmitter and receiver design.

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Just like the FT-1000, Yaesu have designed the FT-990 to be as easy as possible to operate. The front panel layout puts all frequently used controls right where they should be... at your fingertips! All controls are clearly labelled and the digital display provides an abundance of information in an uncluttered and easy to read format. The front panel keypad offers one-touch band select on (160m - 10m) with 2 independent VFOs per band and 90 memories that store the operating data held in both VFOs. You can't help but appreciate the large back-lit analogue meter rather than those confusing bar-graph meters found on other transceivers.

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- Customizable RF Speech Processor - Yaesu's unique Frequency Shifted Processor (FSP) lets you shift the IF passband of your transmitted SSB signal to provide maximum punch with your voice/microphone combination.
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Two 10-bit DDS and a magnetic rotary encoder provide silky-smooth VFO tuning, pure local oscillator signals, and very fast Tx/Rx change-over... and that's very important for QSK CW and digital modes. The DDS is teamed with an extremely low-noise, high performance receiver front-end using a PIN-diode controlled push-pull RF amplifier followed by a quad-FET ring mixer. The result is a very wide receiver dynamic range from 100kHz to 30MHz. Transmitter signal purity is also enhanced, with circuit noise nearly 80dB down from the carrier.

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AWARDS

JOHN KELLEHER VK3DP - FEDERAL AWARDS MANAGER

Murphy

1. I knew it would not be long before he tripped me up in regard to the world grid locator map. I only have one copy, for my reference in checking applications for the grid square award. This one copy is in book form, published by the ARRL, and should be available soon through this office for \$10 incl p&p. The short basic program for determining grid square location is available for a SAE.

2. In reference to the Flying Doctor Award, all information stands, except for:

(i) Contacts for the award can now take place on any band, any mode, within the restrictions of the licence.

(ii) All VK6 stations can be claimed as "instant qualifiers" no matter what band or mode.

(iii) The award is offered by the "Twenty-Eight" chapter of 10-10 International, and is available to any radio amateur or shortwave listener in the world. (SWL to list both stations heard).

My thanks for this information go to Dave Hancombe VK6ATE (certificates manager - RFDS Award) and all applications should be addressed to him at PO Box 1073, Subiaco WA 6008, Australia.

This is an excellent chance for radio amateurs to help the work of the Royal Flying Doctor Service.

Help

To help me keep my files in order, on any future applications for awards, updates or general correspondence, please include your call sign, address and, most importantly, the

date of your correspondence. Also, inform me of any changes in call signs.

Port Adelaide Radio Club VK5APC 10th Anniversary Award 1992-1992

The Point System

In order to become eligible for the PARC award, four points must be gained.

A club contact with VK5APC is worth two points.

Contact with PARC members is worth one point.

(EG: One contact with the club plus two members or four contacts with different PARC club members).

Applicants for the Awards Must Record:

Call sign, date/time UTC and frequency. Shortwave listeners need to report only four contacts in order to qualify, recording date, time UTC, frequency and both call signs.

The award contacts can be made on all bands in any mode.

Cost \$A5.00 or five IRCS. Award runs for eight months, from 1 April until 31 December 1992. Correspondence to PO Box 218, Alberton, South Australia 5014.

1000 Miglia Award

The Associazione Radiosamatori Italiani (ARI) of Brescia yearly issue the 1000 Miglia award dedicated to what was the world's most beautiful car race: the "1000 Miglia".

The 1000 Miglia award will be issued to

any licensed amateur station and it can be attained only during the two-month period within which falls the historical 1000 Miglia.

Award Rules

Activity Period: the yearly award activity period starts on 2 April at 00.01 GMT and ends on 31 May at 24.00 GMT.

Bands and Emissions: all bands assigned to Region 1 and all emission modes with the exception of frequency modulation.

Score: contacts with ARI members, resident in Brescia province, will count as follows:

(a) Two points each during the three-day-long Mostra Mercato di Montichiari (Montichiari Ham Fest).

(b) Three points each throughout the four-day duration of the historical 1000 Miglia and, for the same period, three points each for the two ARI official stations of Rome and Ferrara, and the official station of S Marino Republic, stage cities of the 1000 Miglia.

(c) One point each for the remainder of the activity period. Dates of events mentioned at points a) and b) will be given year by year. In 1992 the Montichiari Ham Fest will take place on 1-3 May, while the historical 1000 Miglia will take place on 21-24 May.

Special Requirements: throughout the award activity period a special call sign station belonging to ARI of Brescia IU2MM will be on the air. The score contribution of this station is five points.

Limitations: only one contact on each band with a valid station is allowed throughout the award activity period.

Final Score: the final score computation is as follows:

- Total score x 1 for Italian stations
- Total score x 2 for European stations
- Total score x 3 for non-European stations

The above computation must appear at the foot of the log summary.

Call signs: all stations valid for the 1000 Miglia award will use their own call sign followed by /IU2. As mentioned above, IU2MM will be the call sign of the special station belonging to ARI of Brescia, while IU4MM, IU0MM and T70MM will be the call signs of the official stations of ARI of Ferrara, ARI of Rome and ARISM of S Marino Republic respectively.

Call: all the above stations will call as follows:

- Phone: CQ DIPLOMA 1000 MIGLIA
- CW: CQ DMM

Award Application: the log summary, counter-signed by two hams or by the chairman of the local radio club, shall be accompanied by Lire 10,000, \$US10, or 20 IRCs and sent to: Sezione A R I, PO Box 230, 25121 Brescia, Italy.

Applications received by the Award Committee after 30 September of the same year will not be taken into consideration.

Awarding of Prizes: the delivery of prizes will take place the subsequent year on the

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ASSOCIAZIONE RADIOAMATORI ITALIANI

1000
MIGLIA

SICAR



occasion of the Montichiari Ham Fest organised by Centro Fiera di Montichiari in co-operation with the Associazione Radioamatori Italiani di Brescia.

Prizes:

a) The 1000 Miglia award will be sent to all those radio amateurs who forward a log summary in conformity with the award rules

and with a final score of at least 30 points.

b) A silver medal and the 1000 Miglia award will be assigned to the ham at the top of the list on each band.

c) The prize for the radio amateur who achieves the highest final score consists of a one-week stay - for two persons - in a locality of the Garda Lake, offered by the Award sponsor: the Centro Fiera Spa di Montichiari.

Decisions of the Award Committee pertaining to the administration of this award shall be final. Radio clubs that send log summaries of at least three of their members will receive a special award. All contacts will be confirmed with a QSL reproducing the 1000 Miglia award.

Best 73 from I2IQ Mauro Bettelli, ARI Brescia Chairman.

HOW'S DX

STEPHEN PALL VK2PS - PO BOX 93, DURAL 2158

By the time you read this month's "How's DX?" column, I should be somewhere in the middle of Europe. As they say in the trade, my KYL and I are on our "well earned holiday". It was 20 years ago when we visited the Continent for the first time since we left it shortly after World War II. Being away on the other side of the globe for a few months will give me the opportunity to reflect on the past, and also on my minuscule contribution to the world of DXing. I will also try to look into the future and will seriously consider whether I should continue to be bound day by day, week by week, month by month by an invisible umbilical cord to a black box and to my typewriter among mountains of paper and scores of letters in the name of the ever-so-passionate hobby, amateur radio and DXing.

Changing working environment and age suggest I should stop. However, I will make up my mind only when I return in a few months time. What do you, the readers, think? Your written comments to my usual address will be appreciated.

Kermadec Islands - ZL0

For months, the world waited for some amateur news from this island group. The much heralded activity of George ZL6BS has turned into a "negative" result, and the proposed DXpedition by Ron ZL1AMO was cancelled because of lack of funds.

It was, therefore, a complete surprise when Bob ZL4DO turned up on the "222" net on 21 March. Bob was on the island on official duty for a short period - 24 hours only - as ZL8RS, yet he made hundreds of amateurs happy with his activity. QSL to his home call.

North Korea - PS

The ARRL released the following news on 27 February:

A project has been launched to encourage amateur radio in the Democratic People's Republic of Korea. It was announced today that the International Amateur Radio Union (IARU) will participate in an international project aimed at establishing Amateur Radio in the Democratic People's Republic of Korea (DPRK). The announcement was made in Torremolinos, Spain, site of the 1992 World Administrative Radio Conference. The project is based on preliminary discussions held in Pyongyang earlier this year, where the authorities of DPRK indicated their positive attitude toward such an initiative. Several amateur radio groups and IARU member societies are offering their co-operation and support.

The project group is led by Dr Seppo Siisalo OH1VR. The co-ordinator for IARU is President Richard L. Baldwin W1RU. Detailed discussions are under way and the project is tentatively scheduled for May 1992.

CONTESTS

RD Contest 1992

Date: 15-16 August 1992

Rules: Will be same as last year, that is, no change this year from previous year (1991).

N Penfold

FCC

1 April 1992

Albania - ZA

News is starting to filter through about the fledgling amateur radio movement in Albania.

The past Hungarian DX and training activities of the first group in September/October last year, ZA1HA, ZA1QA, ZA1DX, ZA0RS, are starting to bear fruit. The second Hungarian team, which operated under the callsign ZA0DXC, has established a VHF station at the town of Elbasan, situated south-east from Tirana, the capital. It trained operators and went on air with the local club callsign ZA1FD. At the beginning of February the third Hungarian visit under the guidance of HA4YD and HA6NF held theoretical courses for a number of radio club leaders, demonstrated HF and VHF equipment and, as a result, ZA1FD has now the following trained local operators: Fatos, Bujar, Hqmet, Demir, Agim, and the first YL SSB operator: Anila.

A more accurate news-source dated the establishment of the (older) Albanian Amateur Radio Society as 1957. This radio society

has nine radio clubs in the following localities: Tirana (2), Berat, Luja, Krija, Penkoper, Pograde, Skodra and Elbasan. Latest news is that the local high-school students in Elbasan, who are interested in amateur radio, have been formed into a youth group and are receiving English language instruction, specifically oriented towards an average radio amateur QSO. It appears that past efforts of the various Hungarian amateur radio groups over the past five months have paid off. Amateur radio has been firmly established in Albania and, hopefully, the licensing problem will be solved soon. It still appears there are two authorities that issue valid amateur licences: The Albanian PTT and the Ministry of Culture Youth and Sports.

Christmas Island - VK9XM and VK9XN

Despite location and propagation difficulties, the DXpedition of Lanny W5BOS/VK9XM and Bob W5KNE/VK9XN was a great success. First activity was at 1154 UTC on 11 February, and the last QSO was at 1525 UTC on 24 February.

If you want to QSL direct, send your card to W5BOS Lanny Phillips, 505 Bellah Dr, Irving, Texas 75082, USA, or to Bob Winn W5KNE, 635 Williams Way, Richardson, Texas 75080, USA. Please do not QSL via the VK9 QSL Bureau. Bureau cards should be directed to the W5 Bureau.

Afghanistan - YA5MM

Despite the gloomy predictions that this activity might not take place, YA5MM appeared on the band and finished off around 20 March.

They were quite active on several frequencies and even paid a surprise visit to the "Southern Cross DX Net" on 13 March.

However, there is some confusion regarding the correct QSL route. Some sources suggest that the cards should be sent to LZ1HA Todor Dikov, Box 603, 1000 Sofia, Bulgaria. Others say the instruction was to send the card to Igor Petreshko, Box 321, 1000 Sofia Bulgaria. The best bet is to send the card to the address the operator of YA5MM has indicated to you.

The Travelling Show - HA5BUS

The Hungarian Bus is on its way to Australia. In the last days before my departure overseas, a good reason for the hurried look of this column - a big envelope arrived from Lmi HA5HO, who is the organiser of the Hungarian Bus expedition which is going around the world, and is better known as the Globe-EX- Foundation. It took four weeks for the registered air mail envelope to reach Australia from India.

According to the original schedule, the Hungarians were supposed to be in Perth, WA, on 1 March, and were supposed to depart



Globe Expedition antenna work in Tehran. L to R: HG5CHI and HA5HO



Inside the Globe Expedition bus - L to R: HA5HO, EP2AG and EP2HZ.

from Sydney on 24 April. However, according to their letter, they are already one and a half months behind with their projected timetable, so expect them to be in Perth probably in the middle of April. As I write this, they were still without an Australian licence due to the non-existence of a reciprocal agreement between Hungary and Australia. Should you hear and/or meet them, please extend to them the usual amateur courtesy and help. Incidentally, it appears that their Iranian activity is quite legitimate. I have sighted a photocopy of their Iranian permit issued by the TCI Tehran, in English and in the Iranian language, and both permits refer to the call sign as EP/

HA5BUS.

After eight months of preparatory work, and several written applications to the Iranian authorities, the crew of HA5BUS arrived in Tehran without a licence. The last written application was made on their behalf by the Hungarian Department of Telecommunications without a positive result. In Tehran it took them four weeks of almost daily personal representation before the authorities agreed to give them a "permission" to operate. In the beginning, the Hungarians were plainly told that, because there is no legislation which regulates amateur radio activity in Iran, their application cannot be considered favourably,

despite the fact that the Iranians understood the expedition's international importance. A little while later the Hungarians were told they have now a "verbal permission to operate." Wisely, they did not avail themselves of this enticing opportunity. According to Imi HA5HO, "No one in his right mind should ever take up an offer like that, especially in a country where regular police patrols were inspecting the bus on a rotation basis."

After 19 days of constant lobbying, visiting various departments and government offices they received, on 14 December, the magical paper which says, in part: "To Globex Co EP/HA5BUS. Further to your application No 1991/435 dated 11 December 1991, we give you a temporary permission to use the unit up to 27 December 1991, 8pm." The permission was signed by an official of the Frequency Department, Iranian TCI. Seeing that Imi HA5HO was the only HF operator - the other two Hungarians have VHF licences - a total of 120 operating hours produced 11,537 QSOs. During their stay in Tehran, they met several active Iranian radio amateurs, among them Hassan EP2HZ, who fronted up to meet them with his friends, Mohammed EP2MHB and Ali EP2AG. According to Hassan, they are known to and tolerated by the local PTT office. Officially, however, the (Iranian radio amateurs) "do not exist" because of the absence of the relevant legislation. They hoped the EP/HA5BUS activity, despite its short operation, will assist them in their endeavour to have the amateur radio service approved in Iran. To finish the story on a bright note: I just heard the good news that the EP/HA5BUS activity has been approved for DXCC.

South Sandwich Islands - VP05SI

The DX team left the Falkland Is on 14 March and was first heard in Australia on Sunday 23 March. Their intention was to operate on the following frequencies only: (CW) 1824, 3524, 7024, 10104, 14024, 18074, 21024, 24894, 28024. (SSB) 1845, 3795, 7065, 14195, 18145, 21295, 24945, 28495. (RTTY) 14090, 21090, 28090. They hope to make about 60,000 QSOs, and promised to pay particular attention to VK/ZL and South-East Asia areas, but the main activity will be with North America, Japan and Europe.

Future DX Activity

- Dave, who had given many DXers a contact with Sierra Leone as 9L1US, will sign as A22US from Botswana from April. QSL to WA8JOC.
- Apollo SV2ASP/A is still not active from Mt Athos.
- During 1992, radio amateurs in French Caledonia may use a special suffix to celebrate the 50th anniversary of the arrival of the US troops on that French island on 12 March 1942. FK8GP/50USA was worked, and others were also heard with

this particular suffix.

- WB7FRA Craig will be active from Nevis Island for the next two years under the call V47ITU.
- Paul IR4JB and his father IIRB will be active from ITU headquarters, Geneva, between 1-3 May, using the callign 4U7ITU.
- Hignet Shyphjeja, c/- PTT Elbasan, Albania, was heard operating as ZA1HS. ZA1QJ was also heard. He was Otto DL1QJ.
- If you hear the VR2 prefix again, it is not something from the past. Fiji was using that call prior to 1971. It is reported that the Hong Kong authorities now issue new calls with the VR2 prefix.
- FR5ZU/T was reported active from Tromelin Island.
- Burkina Faso will be on the air for the next 12 months activated by XT2BW.
- YU3PR will be active in May from YU1BGD. QSL to YU2AJ.
- 388DB has indicated he might visit St Brandon Island later this year.
- John N0PMF/KH8 will be active, on 10 metres only, for at least one year. QSL to John Rankin, General Delivery, Pago Pago, American Samoa 96799.
- V86PB is Peter G3ZSS in Brunei for the next two years. Expect him to be active, especially on six metres.

Interesting QSOs and QSL Information

Note: callign, name, frequency, mode, UTC, month.

- 9K2YA-Yousef-14282-SSB-0657-January. QSL to Yousef Abdul Moeen Ali Shajji, PO Box 13210, Kaifan, 71953, Kuwait.
- A61AD-Caeed-14226-SSB-1421-Jan. QSL to WB2DND Donald R Greenbaum, 250 Standish St, Duxbury MA, 02332 USA.
- YK1AO-Omar-14224-SSB-1447-Jan. QSL to PO Box 245, Damascus, Syria.
- 4J170GAT-21246-SSB-1256-Jan. QSL via Bureau, via DL1VJ.
- TU2KZ-Kouma-21029-CW-0453-March. QSL to Assen des Amateurs Ivoiriens 01, BP 2946, Abidjan 01, Ivory Coast.
- V47ITU-Bill-21028-CW-0429-March. QSL to Box 608, Baaseterra, St Kitts, Leeward Islands, Caribbean.
- P43BW-Bert-14226-SSB-1140-Feb. QSL via the Bureau.
- 4S7/ON4IPA-Wim-14226-SSB-1206-Jan. QSL to International Police Association, PO Box 88, Brussels, 23, B1000, Belgium.
- KK6RT/P/KH0-Thomas-14165-SSB-March. QSL to J1EEIE via the Bureau.
- F00CI-10103-CW-1235-Mar. QSL to N7QQ (See April AR).
- Y45MM-14226-SSB-1119-Mar. QSL to Igor Petrasheko, Box 321, 1000 Sofia, Bulgaria.

RTTY News

As this column was written well in advance of the normal cut-off date for contributors, Syd's notes have not reached me at the time of closing. Apologies to you and also to Syd VK2GS.

From Here and There and Everywhere

- 3A2LU was recently worked on 21355 and will be active again in the near future. QSL to F8AXX.
- Alan VK5ZN reports the existence of a new specialised net. PLANET is the environmental amateur radio network. This net meets every first and third Saturday on 14,333 at 1830 UTC with net control Bob K3SRO. At 1300 UTC the net controller is WENPS. This session of the net is directed to the Pacific. For further details write to PLANET, 19 Glen Rd, Lenedale PA, 19446 USA.
- Frank/Zbig - VK2EKY/SP6EKY - who is now living in Japan, sends his greetings to his Australian friends. He is operating mobile these days as J76AAK/M, and can be found on the 21, 28, 29 and 50MHz bands. And he also has new CW facilities in the car.
- There is a new operator at the Polish polar station HP0POL. QSL now goes to SP9DWT.
- Don G5XIT reported that the next 160m newsletter will appear in April/May.
- The RSGB International HF and IOTA convention will be held at the ICL Beaumont Conference Centre in Berkshire from 25-27 September.
- Antoine 3D2AG was still on Rotuma at the end of March 1992.
- Some time ago, a few Australian and USA amateurs were after the QSL information for the October 1984 Mellish Reef operation. It was Les VK2WU (since re-issued), who operated as VK9MR. Les was also active on Lord Howe Island in 1983 and 1984 under the call VK9LA (since re-issued). If you still want a card for those activities, write to Les Cullen VK3WA - direct only - with SASE, as Les is not a member of the QSL Bureau. Send your letter to 43 Hillcroft Drive, Templestowe, Vic 3106, Australia.
- Bob VK9ND advises that in the future, due to cost increases, he will QSL direct only to those who will include the appropriate return postage in their letters. Please do not QSL via the Bureau. Bob can be contacted at PO Box 279, Norfolk Island, South Pacific 2899.
- The address of the Estonian QSL Bureau is ERAU, Box 125 Tallin, 200909 Estonia.
- It was reported that Lloyd and Iris W6KG and W6QL were active from Macau as XK9TQL. QSL to YASME.
- Don Search W3AZD is not working any

more at the ARRL DXCC desk. The League is now looking for a DX specialist for a job which pays around \$US25,000 a year.

QSLs Received

Note: W=week; M=month; Y=year; FM=from; MGR=manager and his call; OP=operator and/or his/her call.

Direct QSL received: * J6LRU (15M FM MGR) JT1BV/UAOS (1Y FM OP) * BY4RS (6M FM OP) * ZSSS (6M FM OP) * A22GH (4M FM MGR G3KMQ) * FJ6BL (2M FM

MGR F6AJA) * V63CJ (5W FM OP) * YK1AO (7W FM OP) * P43LJP (6W FM MGR P43ARC) * 487/ON4IPA (6W FM OP).

Bureau QSL cards received. HB0/DL1GGT (2Y 10M FM OP) * 3C0LBS (2Y 6M FM OP) * ZC4RF (8M FM OP) * OY7ML (1Y 9M FM OP) * SV9ABG (4Y FM OP) * V73AT (3Y FM MGR K2CL) * ATOT (2Y 6M FM MGR W8XM) * ZF1RC (3Y FM OP) * KP2A (2Y 6M FM MGR W3HNK) * 487RO (3Y FM MGR DJ9ZB).

Thank You

To all my helpers and contributors: please have a rest for a couple of months, but start sending in reports and news very early in July. A big thank you especially to: VK2DID, VK3DD, VK5ZN, VK6NE, HA5HO, HA6NF, 7J6AAK/M, and the following publications: QRRZ DX, The DX Bulletin and the DX News Sheet.

Good DX and 73

AR

VHF/UHF - AN EXPANDING WORLD

ERIC JAMESON VK5LP - PO Box 169 MENINGIE 5264

All times are Universal Time Co-ordinated (UTC)

Beacons

50.043 ZL3MHF Aylesbury RE66, as reported in December 1991, appears to be operational, but ZL3MHB on 50.0525 Grey-mouth RE67 is not on air.

Six Metres in Australia

Whilst we can never hope to emulate the scale of 6m workings that seem common to the northern hemisphere, whether it be winter or summer, nevertheless, there have been a few good catches here, with JAs being an almost daily occurrence even at Meningie!

5/3: C21BR on Nauru Island to VK3RH. 6/3: 0100 KC6RR on Palau Island worked by VK4ZJB and VK3OT; 0250 JA5RC and others; much activity between 38 and 46MHz, strong oriental style music on 42.7 at 0750, then pagers up to 46MHz until 1000, strong Ch 0 on 46.250, TV on 49.750, power line noise up, everything looking fine for an opening to Europe, but by 1030 no signals above 38MHz!

4/3: VK4ZJB reported T30JH worked by VK2, 4 and ZLs 0201 to 0301. QSL via VK2GJH. 7/3: 0300 JA8, JA9 at 89; 0329 JA8RC worked C21BR; 0420 Charlie KC6RR to VK1, 2, 3, 4, 5, 6 including VK5LP at 8/9/89 and still strong at 0530. At 0555 KC6RR observed working VK66 HK, RO, WB, ZFG, KRC, ZSB, JJ, KZ, WD, AKT, ZFY, WN, RO, AO, OD, ZPP, JKR, ABR, VK5N, RO, AZM, ZRO, KPW, ZKV, ZDR, ZBK, ZAH, KK, AKM, most being heard on backscatter here. Others to be heard similarly were in VK2, 3 and 4; at 0615 there were many JAs at 89; at 0800 JT1CO/B at SI/2 from Mongolia was heard by VK3OT and VK5LP at least, but no answers to CW calls; at 0820 there was strong RTTY on 50.081, by 0830 all gone. Then, at 1134 Tim V73AT was 539 on 50.104. Quite a day!

Courtesy of John VK4ZJB, QSL info for JT1CO is MRSF, PO Box 639, Ulaanbaatar-13, Mongolia. That's a different address than the one on the card sent to Don VK6HK, but I suppose we need to adhere to the later address. John's QSL arrived early March and was posted on 19/12/91, so it appears to take

nearly three months to arrive, but then, to be fair, Mongolia is not exactly adjacent to us!

11/3: 0400 JAs again, 0600 strong radio telephone around 41.2, 0715 48.26 and 49.750 strong, signals everywhere between 38 and 50MHz, peaking 320 degrees; all gone by 0900. 12/3: JAs again from 0200; 0529 worked KC6RR 5x9 again, this time with Dave at the helm - the station was to be dismantled on 13/3. VK4ZJB reported KH6JB/KH7 today. 13/3: 0100 JAs; 0115 Clipperton Island DXpedition station FO0CI worked VK4s DDC, KJL, KK, APG, ZAA, ALM. 14/3: 0200 JAs; 0400 V85PB on Brunel to VK4s DDC, KJL, APG.

18/3: 0015 C21BR to VK2, 3, 4; 0120 NI6E/KH6 529; 0130 VK3LK working JA; 0140 beacons JA5YBR, JA7ZMA, JA2IGY all 559 at Meningie; 0630 very strong video on 48.26 and 49.750 with video crud all over 50MHz; 0656 VK3LK heard calling Europe; between 0710 and 0830 many papers etc between 38 and 42MHz and Ch 0 on 46.250 very strong; 0925 VK4s on Es, but no opening to Europe. 19/3: 0330 JAs, no signals above 41.3. 20/3: 0440 JAs and video on 46.25, 48.26 and 49.75, all still there until 0615 then dead. 21/3: 0300 JA7ZMA S5. 22/3: dead band. 24/3: 0330 JAs, most of day pagers, telephones etc crowded the band from 38 to 46MHz, but 50MHz bars. 2250 Roger VK6NY worked T30JH 4x3, nil here. W67 to VK2, 3, 4, also T2JNA noted. Overheard N6AMG telling VK4s on 50.110 not to call him when he was trying to work other areas!

25/3. mass of strong signals of all types 38 to 46MHz for most of day. 49.750 in and out, no JAs, but they were there next morning with a vengeance at 2200 with CW everywhere, but a lot of flutter on the signals. 3D2AC from Rotuma Island around 2300 was working VK2, 3, 4, 7, 8.

26/3. 0005 JAs to ZL3, CT and CU. 0021 at last I worked 3D2AC 5x3, although he was S9 in VK3 - thanks for the extra warning, Steve VK3OT. JAs on and off all day.

Courtesy of Steve VK3OT is an interesting comment regarding the events of February 1991 and 1992: *The following shows the countries which were available for those fortunate*

to have been in the target zone for the propagation: 5/2/91: 1022 - SM, OH, LA, OZ, G3. 5/2/92: 1000 - SM, OH, LA, G3. 8/2/91: 0913 - DL, G3, ON, PA, SM, OZ, GJ4, OH until 1104. 8/2/92: 0740 - DL, OK, ON, PA, SM, OZ, GJ4, OH until 1105.

News from the United Kingdom

I never cease to be amazed at the high level of 6m activity which always seems to be available from and to the UK and Europe, no matter what the time of the year. Of course this is aided by about 50 countries in Europe now having 6m operating status, many within Es distance and often assisted by auroral propagation.

However, the following report from Ted Collins G4UPS for February 1992 will show that contacts are not confined to Europe but are very widespread and include all continents, and we in Australia need to remember that it is still winter in the northern hemisphere! Their 6m day usually commences around 0730 and can extend for the whole day, often until 1830 or later. The first half of the month includes times and other information, the latter half the prefixes available. Unlike us, they do not appear to spend too much time just listening to white noise on six metres; there is always something to hear or work.

1/2: 0808 heard 4X1IF 559 and 5B4CY beacon; 0831 OH stations work VK5; 0912 OD58K in Lebanon works 30 UK stations and later OY9JD Faroe Islands; 1900 W4 into OH, ES stations into KP2A and W; later W to various parts of Europe. 2/2: 1106 FY7THF beacon 449; 1110 TU4DH 5x8; 1200 CN8ST to K1 and VE; 1233 KP2A to EA; 1259 heard H18A. 4/2: 1220 KP2A working F and I working ZS; 1323 ZS6AXT, ZS6LN and ZS6WB working G, 1354 QO5 VE1YZ and VE1ZZ working ZB2.

5/2: 0912 OH hearing DX1HB beacon on 50.008, at 1005 KG6UH/DU1 working Europe, 1026 V86 and JA working all over Europe except G, 1045 V86 to GJ4ICD, 1116 VK6RO 559, 1210 VK6PA to UK at 5x8, 1225 I stations hearing VO1ZA beacon and SM/LA hearing P43FM, VE into northern UK. 6/2: 0800 LA92ZV to VK6HK, 0945 YU working JA, 1240 VK6RO 449, 1252 VE1 to PA, DL, I, 1351 K1TOL and K1IKN 559, 1500 VE to SM, OH.

772.0905 GM works 4X1HF and 5B4YX, 1020 UL7GCC 5x9, 1220 VK6RO to G, 1400 to 1621 extensive opening to VE1, WA1 with all signals 5x9, 1649 N4EJW 529.

8/2: (This was the big day for VK as reported last month ... 5LP) 0745 strong inbound video, 0800 VK to YU and I, 0845 4X1HF 579, 1017 VK2VC 559, 1040 KG6UH/DU1 5x6, 1100 VK5 to SM, OH, 1112 to VK6JJ, VK6AKT, VK6JQ, VK6HK, VK6KRC mostly 579. 1150 to VK5KK and VK5BC, 1218 KG6DX, 1315 VK6RO (the latest VK ever worked in UK) but some G stations still hearing VK at 1350. 1350 HC1BT 599, P43FM, 559, H18A 599, 1420 VE1YK 579, 1443 to 1602 OZ1LO, GD3AHV, PA3EUL, GD7JQI, ON4PS, DL5BBW That's a spread of at least 13 countries on five continents - only Africa was missing! 10/2: 1250 heard P43FM working W3WA, 1604 ZS9A 579 to W5 and others, 1610 AA6TT reports HIO beacon strong, 1835 W working 9H5.

11/2: 0855 LZ hearing strong video from Europe, 0905 9H to KG6UH/DU1 and JA, JAs continue until 1104. Between 1110 and 1713 heard or contacted SM, OH, PT7NK, DX11HB/B, VK4FP, VK4JH, 9H hearing OX3 beacon, KP2A, 5V7JG, VE1YX and many others, VO1NE, K1TOL and others, N4KWX, N4MMD, W3JO, WASHKOM, W2ZKE, and the list goes on. 12/2: 1031 VK8ZLX 5x5, 1140 VK6RO, then on to VE1, OK, W1, K3, WA2, N4 etc. 13/2: 2.0935 UL7, PA, DU1 to 9H1, LA, OH, SM to PT7NK, 1136 5B4YX, RA2TES, DX1, LA to 5V7JG, many JAs, VE1 again, YS1AG to DL, OZ.

14/2: Stations heard or worked include VK6PA, I, V86, JA, K1, VE1, KN4. 15/2: UK7GCCP, 9H1, DU1, VK4KK, 4X1HF, VK8ZLX, VK6PA, PYOFF. 16/2: DU1, YU, OH5NQ, V85PB, DU1, VK6JQ, JH4, W1, SM, V51VHF/B, 7Q7CM, 7Q7RM. 17/2: DX1/B, OH, 9H1, LA, 5B4YX, DU3, JA, OH2BK, V85PB, UL7GC, VK4, VK6JQ, VK6PA, CN8, W1, PA, ON, KJ4E. 18/2: VK3, 9H1, OH2BC, V85PB, 5B4YX, JH4, VK6PA, VK6JQ, JA5, 1415 PYOFF into W and OH3MMM at same time. 19/2: DU1, YO2, 5B4CY/B, JA, 5B4YX, VK6PA, ZD6VHF/B, SM, LA, CN8ST, V31YX. 20/2: VK6PA, SV working P67, YV, YU, CN etc, PT7NK, 5B4YX, GM3WOJ, CN8ST, GD3AHV, PA. 21/2: 9H1, CU1EZ, YU, 5B4, 717RM, V51VHF, V88, ON, Z57, TI2HL, V51VHF, Z23JO.

23/2: VK5, JA, UL7GCC. 24/2: 5B4YX, YU, VK6, PY7NK, ON, ZD8VHF, TR8CA. 25/2: TU2QJ, PT7FH, ZS6WB, V51VHF. 26/2: TR8CA 5x9 working UK/Europe. 27/2: V51VHF to 9H1. 28/2: ZD8VHF, TU4DH, TU2QJ, CN8ST, ZS6XJ, ZS6WB, W and VW work YS1. 29/2: 9H1 report DU1, LX1SI reports VK6PA, GD3AHV, SM7FJE.

Other Countries

Estonia: G4UPS says that the first major opening for ES stations occurred on 1/2 when ES5MC, ES5PC and ES6QB worked CN8ST,

the Caribbean and North America. Previously a mixture of Swedish and Estonian operators mounted a DXpedition from Saaremaa Island, off the coast of Estonia, from 8 to 17 August 1991, when on six metres they had 525 QSOs in 26 DXCC countries. Lebanon: Samir ODSKK made his first 6m contact on 31/1 at 1210 with Alan G100TC in a 5x9 SSB contact, running five watts to a groundplane antenna! On 1/2 Samir worked Europe plus 30 G stations. QSLs to KB5RA. Saharan Arab Democratic Republic: Naama SO1A in grid locator IL56FI had his first European opening on 31/1. Tanzania: Masa 5H3RA in locator KJ9S has his first 6m QSOs on 16/2 by working 9H. QSLs via JA3PAU.

Brunei: Peter Bacon V85PB (G3ZSS) is on Brunei for two years and his first QSOs were on 15/2 to OZ and SM. (He has also been worked in VK ... 5L0). Greenland: Bo OX3LX travelled back to Denmark on 17/2 after a few weeks on Greenland. His only 6m contacts were with two local stations, who are active on the band - OX3LX with 10 watts to a dipole and OX3CS running 50 watts to a vertical antenna. Bo's home callign is OZ1DJJ. Kuwait: A 6m permit is being sought for the US club station 9K2USA by Bob WABMOA currently in Kuwait.

Cyprus: 5B4YX was very active in February. QSL to Ian Osborne, Blakefold, Old Paphos Road, Episkopi, Cyprus. Zambia: Peter RJ2HN was due to go home to Japan in April 1992 but has requested a further 12-month stay. After a few weeks leave in April he will return to six metres. Russian Republic: Andy RA3TES was active on six in mid-January; his locator is LO15JW. QSL to Andy Kamsae, Box 13-A, Arzamas 607220, Russia.

Jersey Island

Although part of the UK, Jersey Island, where Geoff GJ4ICD resides, seems sufficiently removed for there to be a difference in propagation when compared with the bulk of the UK. These variations are included in his January/February report.

26/1: Est to USSR and OE5. Worked V96BG 599 and heard XX9 5x4. 28/1: heard UL7GCC in MN83, a distance of 5835km, 1130 VK6PA S9. 29/1: worked UL7GCCP for first British Isles contact, YU and VK6PA. UL7GCC worked CU1EZ for a distance of more than 7500km, VE1s in at S9.

1/2: 4X1HF 529: news that Neil G0JHC worked OD5 and 4x4 for his 100 countries. 4U1UN has been QRV on 50MHz, QSL via W8CZN. 2/2: Large backscatter opening to F, I, O, DI, PA, ON: 1100 TU4DH S9, FY7VHF, PYOFF. 4/2: 1300 KP2A, ZS6AXT. 5/2: DX1, DU1. 6/2: JA9, UL7GCC. 7/2: Worked VE1YK using FT890R and whip from sea level! From home station VE1s, W1, 2, 3, 4, 8 all S9+.

8/2: 0116 JAs on long path - Feb 1989 since JAs heard so late; 0900 4X1HF S9, 9MTV S5, VK4TV worked VK5BC, VK5KK, VK3OT, KG6UH/DU1, VK8ZLX, KG6DX. VK2, 3, 4, 5,

6, 8 heard S5-9. Geoff said *The band was alive from 0900, at 1000 there were weak VK2s and 3s, then it happened. At 1100 VK5BC was 599+ with half the UK calling him, VK3OT was heard in southern England, G6HKM worked VK6SO in Perth, then VK5KK. At GJ4ICD KG6UH/DU1 was S9+ and VK8ZLX was trying to destroy my S meter! KG6DX was pounding into Lancashire and, for the next 90 minutes, VK6s were blasting central and northern England. It was a big opening for VK, so it is interesting to read the story from the other side.*

11/2: JA, VK4, VK5, DU1, VE1, 2, 3, W1, 2, 3, 4, 8. 12/2: YU3, VK8ZLX, VK6, heard ZLTV, VE1, W1, 2, 8, 4. 14/2: JA1/6, DU1, VK, OZ1, VK6PA, W1, 2, 3, VE1, heard N5JHV. 15/2: worked VK4KK, VK4APG, KG6DX, 4X1HF, UL7GCC, VK6PA, TU3EWF, PYOFF, IK8DYD. 16, 17, 18/2: mainly JAs and VK6PA, VK6JQ. 19/2: VK6JQ, UL7GCC, 5B4YX, JA, ZC4KS, ZD6VHF, PYOFF, FR5EL.

21/2: 7Q7RM. LZ1ZP said LZs are interested in 50MHz but at present taxis, fire department etc use these frequencies. If converters are available will try crossband.

22/2: 0830 FR5ELX S9+, FR5EL 5X9+, UL7GCC 599, heard ZS5B, ZS6a, 7Q7s, 4X1HF worked GD3AHV, UL7 to JAs, PA0 to UL7, VK6PA S9, PYOFF S5, PT7NK S5, KP4BZ S5, 9Y4VU S8, PJ3EE S7, 5V7JG S9, H18A S5, A22BW S9, V5A/B S9, ZD8LI S8, KP4BZ works YO1IS. All this was done with solar data of 217, A index 62 and a K of 4!

23/2: GJ4ICD worked all continents in 25 minutes - VK3, JA, 5V7JG, PA0, PYOFF, KP4BZ - do they get it easy over there! ... 5LP

The Higher Bands

Normally I do not report overseas contacts on the bands 144MHz and above unless they are of outstanding importance - most times they are of a local nature. However, I believe this brief report from Geoff GJ4ICD is worthy of reporting and it concerns the 432MHz band.

On 30/1 Geoff worked GB3MA and GOMOK at S9+, while GB3MLY and GB3ANG, both S9+, called all day for no takers! On 31/1 Geoff says the 432MHz band was wide open. SK5UHF S7, ON4UHF S9+, OZ9IT S8, lots of beacons from DL at S9, G3NVOW worked SP3RBF, SM OZ, PD all S9. Geoff said it was a great day, more than 3500 stations were worked on 432, so the band is not dead. (I am not sure whether the 350 is a misprint, but it seems an awful lot of stations. If it is correct, how do we compare ... 5LP).

It is interesting to observe that we in southern Australia normally expect enhanced propagation on the higher bands around the end of January - does the same apply to Europe? Perhaps comment will come from there as to whether it is an annual occurrence.

125MHz

John VK3ZJC advises of some good contacts on 1296MHz. During the Field Day on

14/3 VK3AMZ worked VK1W1/P; 15/3 VK3ZJC heard VK1W1 and VK2BE; (on 21/3 VK2BE and VK1VP were heard on 432MHz); 22/3 VK3ZJC worked VK2BE at 529, 2235 VK3AMZ worked VK2BE, 2300 VK3AFW/P worked VK1BG. These contacts were made using aircraft enhancement and are believed to be the first to those areas on 1296.

John said the path opens later on 1296 than on 432, but tends to improve rapidly and then disappear more slowly. The duration of the contacts is about three minutes. Also, VK3AL and VK7XMT have recently arrived on 1296.

Symposium

Bill Tynan W3XO/5 sent a screed announcing the First Worldwide VHF Ionospheric Propagation Symposium to be held in conjunction with the Central States VHF Society Annual Conference in Keosauqua, Texas, from 16-19 July 1992. Special emphasis will be placed on presentations and discussions concerning 6m propagation. By the time you read this it will be too late for the submission of abstracts of any papers, but for information on registration and attendance, contact Larry Hazelwood W6NZ, PO Box 54437, Oklahoma City, Oklahoma 73154, USA.

Closure

Once again I have run out of space. By the time you read this I hope the equinoxial F2 period will have been kind to you. Closing with two thoughts for the month: A lion and a

oaf may lie down together, but the oaf won't get much sleep and Anybody with money to burn will easily find someone to tend the fire.

73 from The Voice by the Lake

Terrrestrial DX World Records

50MHz*	JR8HTP/S and PYSBA/S	19980.9 km	11/03/82
14MHz	MEAT and Z53B	7858.2 km	31/03/79
222MHz	KP4EOR and LU7DJZ	5917 km	09/03/83
420MHz	XE2GXQ (M6XQ) and K9HME	4150.7 km	15/07/89
902MHz	W6SLUA and W400W	1002.4 km	22/03/88
1240MHz	XE2GXQ (M6XQ) and K9HME	4150.7 km	15/07/89
2300MHz	VK9WS and VK3OR	1885.5 km	17/07/89
3400MHz	N8CA and K9HME	3972.8 km	28/07/89
5000MHz	N8CA and K9HME	3972.8 km	28/07/81
10GHz	N8MY/EAQ and N9YL/VE9	1980 km	08/07/83
24GHz	M8ER/L, M4CH/S	288 km	25/04/84

476Hz	W3RMOX/7 and K7ANO	104.6 km	06/06/86
756Hz	OE9FK and O39PAJ/S	2.1 km	06/06/87
Visible	WA7LYL, W67LSY, W7PMG,		
LIGHT	KY7B and WA7CJO	247.7 km	08/06/81

*This list courtesy Bill Tynan W3XO/5 and QST, February 1992.

*Since this list was published I believe the 50MHz record has been extended, but I cannot find the reference ... VK5LP.

BT

POUNDING BRASS

GILBERT GRIFFITH VK3CQ - 7 CHURCH ST BRIGHT 3741

I had a phone call the other night (31 March, actually) and it was a budding Morseiac named Julie Kentwell VK2KBR, VK2KSE and VK2ISL!

Now I'm only repeating what I was told, but it seems Julie has discovered a new mode of communication which we might have to call TV-Morse.

Julie reckons he was playing around with the VK2RTS colour test repeater which happened to be in his shack at the time, and had hooked his camera into the front end for a bit of a broadcast. Well, he said he built it, so why not? The other users didn't seem to mind. So, we have a colour picture of Julie at his desk going out on 50cm ATV; here is where it gets interesting. He wasn't actually saying anything into the microphone, but he did have it up against the 101 (I think it was a 101) speaker while having a morse contact with Bob VK2MGZ on 10 metres. Not having experienced ATV in my own area, I can imagine how riveting this program could have been, but maybe that's just my imagination.

The idea of slow morse broadcasts using ATV does appeal to me, as there are a few extra hints about operating that would be given with the aid of pictures, even if only how to use the various equipment such as keys and paddles. The mind boggles at the things one could do - how about trying to decode morse by watching the sender with the sound off? ...

or sending pictures of the letters as, or after, they are sent aurally? You could even film Morse-teaching videos.

Finally, from Julie is a bit of news about VK2BWI.

The Saturday night broadcast has a new operator, Doug Chaffey VK2FC (I may have this wrong, as my 1990 callbook doesn't agree).

Also Jim VK2NDI and Mike VK2BMW will give 16-word-per-minute practice on air after the slow morse, if you call back and ask for it.

Silly mode for this month is sending Morse code like this: "... .. - - - - -", on packet radio!!

Here is some news from *Morsum Magnificat* #23, which was sent to me by Tony Smith G4PAI.

June 17th is designated annually by the International Amateur Radio Union as World QRP Day. It is not a contest. The idea is simply to try working with low power.

Many QRP stations will be heard using typical power levels from 5W down to milliwatts. High power stations are asked to avoid interference to these QRP stations - or better still, to reduce power themselves and join in the fun.

(Just for a stir - and to see if it could be done - I would like to see a world QRP day when no-one uses electricity from the mains. Do you think this would be difficult for you?)

New ISWL Publication

The International Short Wave League has recently published a 25x44 page reference booklet, *Standard Frequency and Time Signal Stations of the World*.

Chapters cover: a) an explanation of the various time systems; b) transmission systems used; c) standard frequency and time signal stations in frequency order from 16 to 22536kHz and 95 to 171.15MHz; d) call signs in alphabetical order, including location and frequencies; and e) countries in alphabetical order, with frequencies, transmission times, addresses, systems used and QSL info.

Priced at 3xIRCs post-paid, this publication is available from: ISWL HQ, 10 Clyde Crescent, Wharton, Winsford, Cheshire CW7 3LA, England.

Telegraph Grade Abolished

The Telegraph Grade in British Telecom was finally abolished at the end of March 1991, 151 years after the provision of the first commercial telegraph circuit. Delving into the history of the Telegraph Service shows how important a role it played in the development of communications.

The first commercial circuit in 1839 preceded the first telephone exchange by 40 years exactly. In fact, the first trans-Atlantic telegraph cable was laid 23 years before the opening of the first telephone exchange, and telephone cables did not go trans-Atlantic until 1956.

Until the 1970s, the telegraphists were trained to use Morse code and also to read the

Murray code, the five-unit system punched as holes into paper strips. These skills became obsolete in the 1980s as systems were replaced.

All work is currently undertaken on VDU's, but now the remaining two telegraph grades, Telegraphist and Telegraph Executive "C", are to be abolished after agreement between British Telecom, the UCW and CMA ... from *The CTO Veteran*, official organ of the Central Telegraph Office Veterans' Association.

Duxford RS Re-inaugurated

At a re-inaugural meeting held at the Imperial War Museum's historic Duxford Airfield on 8 March 1992, the Duxford Radio Society adopted a new constitution, with the declared aims of supporting an international interest in the history of military radio, in-

cluding all armed forces, para-military and clandestine (resistance) groups; assisting in the provision of an exhibition of radio equipment at Duxford; and in operating an amateur radio station at the museum, using both modern and historic equipment.

Specially adapted accommodation has been provided by the museum, which will feature an exhibition of equipment later this year with permanent public access when staffed. The Society's own call is G0PZJ.

The purpose of the exhibition and station is to increase public awareness of the important role played by radio in war-time operations and, hopefully, to make contact with many people, whether radio amateurs or not, who can help in achieving the aims of the society, either from personal experience and knowledge of historic equipment, or from a special

interest in the subject.

Active members of the Society can also be members of the Duxford Aviation Society, with various privileges, including unrestricted access to the site, while distant or corresponding members, including overseas members, are also welcome. There are a number of special events/flying days etc planned by the museum for 1992, and a special highlight in September will be the 50th anniversary of the American Air Force's use of Duxford airfield during WW2.

President of DRS is John I Brown G3EUR, and its chairman is Dick Pope G4HDH. Further information about all aspects of the Society, including classes of membership, can be obtained from the secretary Mrs B I Pope, 96 Northolt Avenue, Bishop's Stortford, Herts CM23 5DS, England. **ar**

EDUCATION NOTES

**BRENDA EDMONDS VK3KT - PO Box 445 BLACKBURN S130.
WIA FEDERAL EDUCATION CO-ORDINATOR**

WARC-82 is over and reports are being prepared, distributed and discussed. The main news is that the amateur service has lost neither band space nor privileges from this WARC. However, as was expected, little has been gained. There will be no new "WARC changes" such as came from the 1979 WARC.

The 13 years since the last WARC have seen developments in communications and technology that few amateurs would have predicted. There are now claims for spectrum space for services and modes which did not exist in 1979. Assuredly, there will be similar growth in services and demand over the next 13 years. But, as we all know, there will be no increase in the amount of spectrum available.

We must be aware that many commercial and other interests find it hard to accept the extensive frequency allocations to the amateur service, when the demand for spectrum space is so great. Can we as amateurs justify it? What is it about the amateur service which gives it the right to allocations exceeded only by the Defence Services? We may be called

upon to answer these questions at a future WARC, when the usual stories of past technological triumphs and possible value in emergency situations may not balance the cold cash on offer.

I see two possible approaches (there are probably many more to be considered at other times) both of which must be applied at both national and international level. We need to speak with the loudest possible voice, and we need to make the public and those in authority aware of amateur radio and its potential, both scientific and social.

The IARU co-ordinates and represents amateur radio at international level. Its strength comes from the input to it from each member nation, and its funding from a levy on each national society according to the number of transmitting members.

A loud Australian voice can come only from an active, united WIA, speaking for all Australian amateurs. An increase in the number of licensed and active amateurs is one requirement, so that it is apparent to all listen-

ers that our band allocations are being used to good purpose. But we also need a high WIA membership, to represent the Australian amateurs to the Australian and international authorities.

To make the public and authorities aware of amateur radio we must take every opportunity to publicise or report on amateur radio activities. This may be at local community level, eg the communications for a Fun Run being supplied by amateur operators, or a talk by an amateur to the local school students, or through the national media such as the reports published on the contacts with MIR. There are probably hundreds of events involving amateur radio which could receive publicity, but do not because no-one bothers to provide the media with reports.

So, do you want your grandchildren to have the access to amateur radio which you now have? How are you going to ensure the bands are still there for them to use? Perhaps you do not feel that one person can have much effect, but you can go out and tell the world about this marvellous hobby, with its potential for both uniting distant individuals regardless of race or language, and challenging and extending scientific knowledge. If you do not, who will? **ar**

AMSAT

**BILL MAGNUSSON VK3JT - 359 WILLIAMSTOWN RD YARRAVILLE 3013
PACKET VK3JT @ VK3BBS**

National Co-ordinator
Graham Ratchiff VK5AGR

Please take note of the AMSAT information nets:

AMSAT AUSTRALIA net:
Control station VK5AGR

Check-ins commence at 0845z on Sunday nights
Bulletin commences at 0900z
Frequencies 3.885MHz or 7.064MHz. At pres-

ent 7.064MHz is used.

AMSAT SW Pacific net:
2200z Saturday on 14.282MHz.

Experienced satellite users and newcomers alike are welcome on the nets. A large body of experience is on hand to answer queries. Listen to the WIA Divisional broadcasts for regular AMSAT information.

AMSAT Australia Newsletter and Computer Software:

Satellite users, whether experienced or newcomers, will benefit by subscribing to the AMSAT Australia newsletter and software service. The newsletter is published monthly by Graham VK5AGR. Subscription is \$25 payable to AMSAT Australia, addressed as follows:

AMSAT Australia
GPO Box 2141
Adelaide 5001

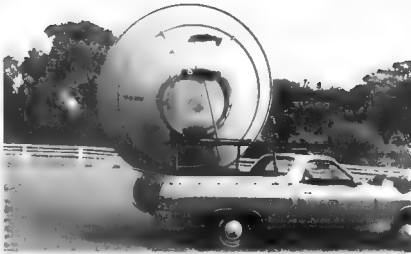
The newsletter provides up-to-date information on all current and planned satellite activity. Graham also provides a first class software service for satellite users. New soft-

ware is reviewed regularly in the newsletter.

Phase 3D Orbit options

Oscar 13's apogee is now moving slowly (ever so slowly) back towards the southern hemisphere. This means longer and better passes for those of us in the south. The apogee is currently about 50 deg north latitude and still out of range for southern VKs. Mid 1993 should see the return of apogees with all the other goodies like modes J, L and S operations, ZRO tests etc. We will begin to see good squints for longer periods. By late 1994 the apogees should be over the equator with the best opportunities for inter-hemisphere DX. All this is, of course, conditional on nothing unexpected happening due to the rather unusual orbit perturbations that Oscar-13 has been experiencing. These are as a result of a less than optimum launch and will mean that Oscar-13 will probably re-enter and burn up in 1996. We'd better get in there and use it while we can, particularly over the next couple of years.

This brings us to considerations of the orbit for Oscar 13's replacement, known during design and launch as Phase 3D. A sub-committee of the phase 3D design team has been working on options for some time now and these were presented last year at the second "Experimenters' meeting". They boil down to three alternatives. All these are, of course, optimised for the northern hemisphere, but



The 3m dish used by Trevor Niven VK5NC at Mt Gambier to make effective use of Oscar 13. Over the period 3-4 January 1990 he worked DL1FCU, OH2DX, VE6WP, JR8XPV, VK7ZFM and VK8OB on mode L. The mobile(?) dish was at the QTH of Ron Johnson VK5AKJ for these contacts, and his 432MHz downlink equipment was used.

none is as disadvantageous to the southern hemisphere as the originally planned orbits of Oscar-10 or Oscar-13. They are referred to as M/N resonant orbits. That is to say, they perform M orbits in exactly N days. One school of thought favours a 3/2 orbit. With an argument of perigee of close to 210 deg this is the most favourable one for the southern hemisphere as far as inter-hemisphere DX is concerned. The planned inclination of 63.4 deg would mean good high elevation passes in the southern hemisphere. The perigee height will be between 4000 and 8000km. It's been decided to go for the highest perigee which is consistent with reliable magnetorquer attitude control which is carried out at perigee. This will also help southern stations. It's been very encouraging to see the interests of the southern hemisphere being taken into account in the current planning. This is due in no small part to Graham's (VK5AGR) inclusion in the planning team and the esteem in which he and the other VK contributors are held.

The second alternative is a 5/3 orbit. This orbit has the advantage of being very stable in the long term and should have a design life of 10 years or more.

Another alternative is a 16-hour sun-synchronous orbit which would be very favourable for the northern hemisphere and more desirable as far as radiation exposure is concerned. The jury is still out, nothing is firmly decided at the moment, so we can live in hope.

Digimoon

This one should be worth following up (if

it's fair dinkum!!). A project to place a digital package on the surface of the moon. The first I saw of it was a packet bulletin a week or so ago. Not much detail, but it seems that a group of research students in Argentina is engaged in designing lunar landers for a future mission and is being encouraged to include an amateur radio package, probably packet. I wonder how we'd set the timing parameters in our TNCs to cope with a delay of seconds in the return signal?

The packet would travel on a NASA mission called Project Artemis, to be launched in 1995 or 1996. This is reported to be a low cost unmanned lunar lander. Lots of design problems associated with the long lunar days and nights, but it has the advantage over a lunar orbiter that high gain antennas could be employed.

This whole deal could be a bit fanciful, but then there were those who thought that Oscar-1 wouldn't work.

With News

The crew change appears to have gone smoothly and contacts on both voice and packet have been reported. It was interesting to see all the new callsigns come up calling the PMS. There has certainly been a big increase in the number of people trying to log on. Probably a result of the publicity and the seemingly exponential growth in packet in the past year.

Farewell message on Sergei's PMS indicated the most convenient way to address mail to him is: Sergei Krikalev, Post of Cosmonauts, Moscow Region, Star City, 141180, Russia. Of course, if you are requesting QSLs, don't forget the return postage etc. **ar**

A Call to all Holders of a Novice Licence

Now you have joined the ranks of amateur radio, why not extend your activities?

The Wireless Institute of Australia (N.S.W. Division) conducts a Bridging Correspondence Course for the AOCP and LAACP Examinations.

Throughout the Course, your papers are checked and commented upon to lead you to a successful conclusion.

For further details write to

The Course Supervisor
WIA
PO Box 1066
Parramatta NSW 2124
(109 Wigram Street, Parramatta)
Phone: (02) 689 2417

11am to 2pm Monday to Friday
7 to 9pm Wednesday

INTRUDER WATCH

GORDON LOVEDAY VK4KAL - AVEKMOHE, RUMTYALE 4702

Freq	Date	UTC	Mode	Remarks	X
7002.5	200192	1120+	A1A	V beacon Vladivostok USSR?	1
7008.5	dly	0830+	F1B/A1a	MWR A1a rarely used 250Hz	9
14002	170792	1007	NOM/A3	Foreign voices, weak, no ID	2
14005	270292	1105	A3	Foreign Lang tone+ jammer, no ID	
14035+/-	180292	1040	J3E/U	Short words speech + NOM, no ID	
14046+/-	dly	0810+	MWY	2chLSB x 2-way c/rf, NOM for tone signals	12
14058+/-	"ir	0833	AC3/NOM	Chn fax + pulses to hold freq	9
14065/70	070292	1008	A1A	VBX VPO of VBX QSV K plus numbers	12
14075	030292+	mml	A1A	VRQ traffic both ways, as above, Vietnam	18
14075	07-1202	1000+	A1A	VBX traffic out, Vietnam	9
14080	070292	0130+	A1A	KFB also on 14088 & 14075 t/c in Vietnam	10
14092	130292	0535	A1A	RG777 followed by short coded msg, Vietnam	4
14095	020292	0930+	A1A	CD de VPC, t/c & calls only, Vietnam	14
14100	160292	0930/35	A1A	ZBK de HZB QSV K R msg? Vietnam	10
14128.5	0802+	1044/1318	F1B	also A1A RTTY approx 4k12 wide	3
14140	020292	0955+	NOM	Constant, no ID heard	7
14138/38	280292	0545+	PON	Motor-boat, audible to 14160M	1
14177	0502	0825+	F1A	U1080 UZ24 de U1080 QSA? GSV	8
14210	daily	0805+	A3E	Harris of 7105. Severe distortion	22
14211	200192+	0930+	ZX7F1b	250Hz 3rd cymbic, 2 sep ch F1b	17
14215/18	020292	1000+	A1a/F1b	F7A t/c in + RTTY, Vietnam	13
14217.5	2001/1102	0800+	mml	UAMS F1CW, A1a, F1b+ mly c/s used MWR USR	18
14250	mml		NOM	No ID heard	3
14228	110292	1642	A3	Bcast stn weak, no ID hrd	2
18075	0202	1203	A3E	Bcast stn talk in Russian	
18078	010292	1225	J3E/L	Russian military stn	
18002	2102	1345	PON	PON OTHER	
18080	1702	1119	A3E	Bcast/r night, foreign, pos Arabic	
24904	140292	1142	A3/L	AM bcast, music, Europe?	
24925	daily	mml	A3/L	Russian military station	11
24950	0202	1041	A3E	Chinese? Music	
24980	140292	1136	A3E	US military station	

Many PON stations on frequency from 18102 through to 29800MHz. Also Russian and Chinese military operations from 24900 to 24925MHz. A proliferation of AM bcast stations on the 18, 24 & 28-29.7MHz sections. VK0 seems to be in the right spot.

21001	270192	0200+	NOM	Always a faint signal	20
21031.5	200192	0410+	A1a/F1b	MWR t/c to UUU UAMS & others, 250Hz, USR	34
21134/5	2801	0400+	A1a/F1b	VVH call at 0453 Z	7
21142/5	210292	1000	dillo	A1a mostly numbers	7
21250	210292	1100	R7B	Usually 4k12 wide	16
21222	270192	1053+	A1A	VW3 3 Hz groups GSV to 21213/18, GRM?	
21253.5	mml		A1a/F1b+	NOM UAMS (note 1 less U than 21031.5 probably different location USR)	43
21317/21					
21328/330	010292	0500+	A1A	P7A mainly rac t/c, Vietnam	16
21370/4	0302+	0805+	A1A	PBV PA7 de PVB QSA? GSV R AS, Vietnam	10

These last three frequencies are associated with Vietnam, or so it seems after hours of observations, pattern is that of VRQ. Contributors this month have been VKs 4AKX, 4BKI, 4BTW, 4BXC, 4CRR, 5TL, 6RO, 6XW and 6WU

SPOTLIGHT ON SWING

ROBIN L HARWOOD VK7RH - 52 CONNAUGHT CRES, WEST LAUNCESTON 7250

Recently, I was able to see a copy of the 1992 *World Radio TV Handbook*, thanks to a friend, as I missed out getting my own individual copy earlier. Glancing through it, I was interested to see that the listing for the Soviet Union was still there. The editors had a footnote that this was the state of affairs as at 15 November. And, as we now know, the Soviet Union is no more, being replaced by a very loose "Commonwealth of Independent States". This itself looks very weak and unstable, with each republic flexing its muscles and pursuing its own independent policies. This is indeed being reflected on shortwave.

The former Soviet Union's external services had a number of senders within the Ukraine, but the Ukrainians themselves have seized these and have denied Radio Moscow and Radio Rossi air time over them. Radio Kiev, which has now been renamed Radio Ukraine, commenced its own "World Service" in Ukrainian. The English and German programs remain unchanged, but it is much easier to hear "R Ukraine" as it is reportedly on up to 10 channels simultaneously. They are still utilizing their own distinctive Interval Signal, so it is easy to identify.

Radio Moscow World Service is still unsure

of the direction it is supposed to take. Funding for the station was originally to come from the CIS budget, but with the CIS itself in some disarray, the station's future is still unclear. Radio Rossi - the Russian language World Service - is financed and controlled by the Russian republic and is very much separated from Radio Moscow.

But, to return to the WRTH 1992, I do notice there is an increased listing of all R Moscow transmitter sites and the times when they will be operational. I would expect the 1993 *Handbook* will be listing each CIS republic separately, which will make it easier and difficult, at the same time, to find listings for each republic. I understand that with the continuing uncertainty of what is happening within the USSR, that groups of monitors are keeping watch even more so these days, compared with those when all transmissions were highly regulated and controlled. Incidentally, Lithuania, Latvia and Estonia are now listed separately in the WRTH, while the situation in the Yugoslavian republics has not been established, and hence all senders are still under "Yugoslavia".

The Red Cross Broadcasting Service has informed its listeners that future transmissions directed to locations outside Europe will be incorporated into Swiss Radio international programming. European programming will continue on the frequency that has been designated to the international committee of the Red Cross, ie 7210kHz. It will be on from 1100 to 1240 and 1700 to 1840 UTC on the last Sunday of the month, repeated the next day. Many listeners will recall hearing the monthly RCBS transmissions at 0740 to 0757, prior to the commencement of SRI. I believe that this has come about because SRI itself has made a significant alteration to their programming strategy.

I have come across two new stations while tuning around recently. One is Radio WJCR in Upton, Kentucky, with an all-music religious format. The station has occasional ID announcements and is wanting to obtain reports. I monitored it at around 1130 UTC on the frequency of 7490kHz. Don't be confused with another American religious station only 20kHz up on 7510. That is in Salt Lake City, Utah, and is a relay of a TV network.

On 21580kHz, between 0230-0330 UTC, there is a station calling itself Radio Filipinas, and is located in Manila. It is a government station and is using the VOA relay bases at Tinang and Poru in the Philippines. The program is in English and concentrating on ASEAN news as well as having an extensive local news bulletin at 0315. Reception was fair to good. Besides the VOA, there are two other shortwave broadcasters from the Philippines - The Far Eastern Broadcasting Co, which is protestant, evangelical and Radio Veritas, which is Catholic, and is jointly owned by Radio Vatican and the local Philippine Catholic dioceses.

As regular readers will have noted, I have mentioned the problems we have had with Daylight Saving here in Tasmania, especially when we go out on a limb from the rest of the nation for six weeks. Well, other countries have also been having second thoughts about it. For instance, China decided it would not re-introduce Daylight Saving Time this year, following numerous complaints.

Remember when the Soviet Union found out it forgot to revert to Standard Time in the '30s and was going to revert one hour last year? Well, that indeed did happen, but when the Soviet Union disintegrated, the various republics were undecided as to what to do. Some have opted for its re-introduction, while others have decided to remain on Standard Time. The Ukraine and Russia are on differ-

ing time zones now, while for 70 years they were identical. As for the domestic situation, the new Tasmanian Government has stated it is going to negotiate with the other states to have a common Summer Time changeover date. Hopefully, commonsense will prevail.

That is all for this month. Until next time, the very best of listening and 73 - VK4RH.

ALARA

JENNY ADAMS VK3MDR

70 KANGAROO GROUND RD WATTLE GLEN 3096

During the past month several members met up at the Bendigo Convention and, by all accounts, had a wonderful time talking to one another without the hiss, crackle and crash of 80 metres. Our net, weather permitting, and occasionally it hasn't, is on Mondays 3.580/- - 1030 UTC (1000 UTC during daylight saving) VK6 ALARA net conducted by Poppy

VK6YL following the national net Mondays 3.585/- 120 UTC (1100 during daylight saving). YL 222 DX net Mondays 1422 0600 UTC VK6DE Bev has a YL chat on Fridays on 0400 UTC 21.88.

VEVK/ZL net Fridays 14.148 0500 UTC. YL Activity Day - 6th of each month - listen on the hour UTC 14.288 21.188 28.588.

If no YL activity heard, call CQ YL.

ALARA birthday YL Activity Day - fourth Saturday in July - 0800-1200 UTC 3.588 14.288 21.188 28.588 and 28.688.

Welcome to our two new members Beryl Bennett from VK5 and Pauline VK2MJP. Congratulations to Joy VK4JOY to VK4AT. Our Annual General Meeting on 21 May is fast approaching.

So, too, is the ALARAMEET slowly getting closer. For information re accommodation available, contact Margaret VK3DML.

Cheers for now 73/38

REPEATER LINK

WILL MCGHEE VK6UU @ VK6BBS - 21 WATERLOO CRE, LESMURDIE 6076

How to Do It

Ever since the early days of talking through amateur repeaters, the thought of linking some of them together has taken up a large slice of idle brain time. Now that regulations have been changed to permit linking, the days of thinking about linking are over, and the time for doing it is here.

The more thinking I have done on the subject, the more options I have found. The ideal option is the hard part. When faced with several ways of doing the same thing, how do you choose? So, when a letter from FTAC turned up on this very subject, it was read with a lot of interest.

The FTAC letter was in response to a letter sent to FTAC by Peter Weeks VK3YZP. Peter is the licensee for three repeaters, and has been involved with repeater linking. Peter's letter was questioning some of the current thoughts on proposed and adopted linking standards. Very important, because amateurs do not want to end up with linking concepts and regulations that cripple linking.

Peter's comments were in response to an article in December '91 AR written by Will Scott VK4XP. Will had spent a lot of time putting his thoughts into the article, and prior to this article appearing, I have had a couple of lengthy phone calls with him, discussing linking. Will's point was that, unless some form of standards was adopted, repeater linking could run into compatibility problems. As the linked repeater network grows, systems may have interface problems. Repeater users may have to use different operat-

ing procedures when moving around Australia. This is a situation which must be avoided. The problem, however, is to produce linking standards that don't stifle development.

Here are some examples of Peter's concern at linking standards-cum-regulations:

How does any amateur know to where he or she is linked if someone else has set up the link? My response to this is, does it matter? If the amateur is in the next street mobile, or hundreds of kilometres away on a pair of snow skis, does this create a problem? However, I may be missing Peter's point. If the repeater being used has several different link possibilities, it may be confusing to know how to clear the current one and establish a different one. This may be Peter's point. Will it be a problem for amateurs if they do not easily know to where they are linked? When talking to another amateur via a linked system, one can always ask where the other amateur is located.

Peter continued: How this linking is to be achieved is not clear. Is it by dedicated links or what? If off-air receivers are used at each end of a link, what happens if someone is using an existing repeater part the way along the link chain? Do they get overridden? My answer to this situation is one of two options: busy tone with no link connection, or if the busy repeater can be by-passed around via a dedicated link, then a connection is made to the desired repeater. Overriding an existing QSO would not be an option.

Peter also comments on the delay with CTCSS encoding and decoding on the link

systems. This is at the moment required by regulation. There is a small delay when using CTCSS for activation of a link. This delay is additive with every extra link path. The total delay over several link systems could be seconds. Not an easy way to operate.

This would be a very annoying problem, and yet it is so simple to solve. Don't have CTCSS encoding decoding on links. Why was it made a requirement?

Peter's letter has many other interesting points, but the most interesting and the one I agree with most is: repeater linking should be on a permanent basis. The whole idea of user-switchable linking sounds good on paper, but when you really put some thought into it, someone is going to end up with one hell of a headache. I think you might well be right, Peter.

Even though I have a lot of time for Will Scott's linking guidelines and the thought he has put into them, when a vote has to be taken on the idea I would be reluctant to endorse them.

Perhaps the best way to go is to have only the loosest guidelines on how repeaters are to be linked. If regulations are kept to an absolute minimum, something ingenious and user-friendly may evolve. There will be problems, but amateur radio is about solving technical limitations.

I hope you have been able to follow most of the points put forward. There are many more that need discussion. I may be putting down the average repeater user, but it is difficult to put into writing some complex aspects of linking repeaters together. The issues I have touched on are only a few of many concerning linking repeaters. Other countries have been linking repeaters together for many years. Some of the systems are vast and ingenious.

Australian amateurs have a long way to go, and starting in the right direction is important. There has not been enough debate on this issue by the amateurs who maintain and

build our repeater systems.

Please, if you have any ideas on the subject, let John Martin VK3ZJC FTAC know. Any input to Repeater Link would also help let

other amateurs know your ideas. Several repeaters are already linked in Australia. How about telling other amateurs how you did it?

DIVISIONAL NOTES

VK2 NOTES

TIM MILLS VK2ZTM

Annual General Meeting

By the time you read these notes the AGM will have been held at Parramatta on 2 May. An election was not required this year, there being the required nine nominations and there is only one new councillor - Bob VK2CAN will replace John VK2EJM, who retired at the AGM. The AGM report was included as an insert to the April *Amateur Radio* and included on the back cover is this year's membership card. The VK2WI broadcasts will report on the meeting outcomes, as will future Divisional notes.

Trash and Treasure

The scheduled event for the end of March was not conducted. Rain overnight and during the Sunday morning showed signs of continuing and the decision was made to defer the event. This was announced on the morning broadcast. However, it then turned into a nice sunny afternoon. Several people apparently not able to hear the broadcast turned up.

Only a portion of the Parramatta car park is under cover. On the day of future Trash & Treasures, all should listen to the morning broadcast for confirmation of the event, should there have been overnight or morning rain. If radios are out, a phone call to VK2EI (02) 651 1489 at broadcast time will get you the answer.

Happenings

Peter VK2NPW has taken over as Intruder Watch Co-ordinator for VK2 from Don VK2EYI ... May Trash & Treasure is set down for 31 May ... The Oxley Region Field Day will be held at Port Macquarie over the June holiday weekend ... The next exam will be conducted by the Division at Parramatta on Sunday 24 May. Contact the office for applications, which close 7 May.

VK2BWI Morse Team

One of the VK2 services is the nightly 80m session on 3550kHz at 8pm local time. The team would like some additional members, both to fill the gaps at times, and provide relief and back-up. Check-in to the net and offer your services.

Broadcast Team

Dave VK2KFU has been compiling the

VK2WI news content for some years. He is soon to take a break from full-time assembly. Contact the Divisional office, if you would like to assist in broadcast preparation. Much of the new news reaches us via fax and is used as received. Please head the page clearly that it is for the broadcast, use double spacing and a wide left margin and sign it as to origin and authorisation. The parts of the broadcast generated on the computer are fed into the packet network, but direct submitted items are not retyped from the faxes and mail.

New Members

The following joined the NSW Division recently, and our usual warm welcome is extended to them.

P H	Adams	VK2GRQ	Leeton
P R	Crosthwaite	VK2GRX	Harbord
I	Danks	Assoc	Singleton
K C	Dundas	Assoc	Narramine
S A	Graham	VK2GOD	Hornbush
S A	Hartman	Assoc	West Pymble
Y	Isid	VK2GRF	Batem
A W	McKay	VK2ALH	Randwick
S J	Rae	VK2XRU	Narrabri
M P	Ryan	VK2RFI	Port Kembla

Dural

There is currently a spare transmitter at Dural on HF, and this has been used for 12m broadcast tests. The frequency used is 24.910MHz, which is that used earlier in the day by the VK4 broadcasts. The transmitter delivers about 100 watts PEP to a dipole at 15 metres, with the main lobes north and south. This transmission, together with the relay of 17 metres (18.120MHz) conducted for VK2WI by Graham VK2DIG and the VK2WI 30 metres (10.125MHz), is the first time that VK2WI has covered the three WARC bands.

As previously indicated, VK2WI would like continued relay coverage on 20 and 15. Our thanks to Peter VK2OG on 20 and Peter VK2NPW on 15 for conducting the first series of tests on these bands.

In time, as equipment is acquired, these transmissions will be provided from Dural.

Some serious thought will have to be given soon to the location of the various beacon antennas of VK2RSY at Dural. Continued tree growth has started to reduce the horizon view each antenna is able to see on the VHF and UHF bands. Ten metres, 28.262MHz, is a sort of vertical in the clear, but it's starting to have a preference to point the wind direction.

73

Remember to leave a three second break between others when using a repeater.

VK3 NOTES

BARRY WILTON VK3XV

In the February issue of *AR* Jim Linton drew attention to an imminent threat to the Victorian repeater network by the privatisation of communication services operated by Victorian Government Services.

We are also concerned that the cash-strapped Victorian Government current policy of implementing the user pays principle for many services could adversely affect the tenure of many sites on which our repeaters are located.

The Victorian Division Council is doing its utmost to retain as many repeater sites as possible, and commenced negotiation with the Department of Conservation and Environment in December 1991.

While we have had many subsequent verbal contacts with that department during the past four months, it appears to be very reticent to make any commitment in writing.

Our most recent correspondence to the Department of Conservation and Environment is as follows:

Assistant Director - Policy
National Parks & Public Lands Div
Dept of Conservation & Environment
Mr D Miller Dear Sir

In reference to our letter Ref VT577-BW dated 3/12/91.

A reply or acknowledgment of receipt of same has not been received to date.

Correspondence received and personal contact with several regional offices are the cause of considerable concern, as there would appear to be differences in the interpretation and application of DC&E policy regarding future charges for licences for our communications sites in different locations throughout Victoria.

An account for rental of \$104.00 has recently been received and paid in respect of a repeater we have located on a Victoria Police site at Mt Nowa Nowa in Gippsland.

Mr Ray Buck of the DC&E Bairnsdale office informed us the charge was made in accord with new policy regarding "shared sites" and that in 1993 we could expect this annual charge to increase to a minimum of \$500.00.

The Wireless Institute of Australia, Victorian Division, is responsible for more than 60 installations throughout Victoria, and does not have the financial resources to enable the payment of site licence fees of this magnitude.

Whilst the licence fee being charged in respect of 1992 would appear to be uniformly

set at \$104.00 on all sites we occupy, we are concerned that at the commencement of the 1993 year we could be faced with an increase in charges we would be unable to meet.

In the event of an increase in charges beyond our capacity to meet, it would be necessary for us to cease our operations and remove all equipment.

Operation could be terminated at relatively short notice; however, as this organisation is reliant solely on the services of voluntary labour provided by the membership, and having regard to the period of time it has taken to establish our repeater installations (over 20 years) it could take at least 12 months before all equipment could be removed.

The utilisation of professional services to remove equipment is not a consideration, as we would be unable to meet the cost involved.

Your advice is now sought as a matter of urgency, as if future DC&E policy is to adversely affect the operation of our repeater network, we intend to seek further consideration by appealing directly to the Minister for Conservation and Environment and enlist the aid of the media to bring our plight to public attention.

The amateur radio service has contributed significantly to the community in the past, and provided service in the time of great public need, eg "Aah Wednesday", and we believe the Victorian Government, in spite of its current financial difficulties, should recognise the value of amateur radio to the community at large, and give our 84-year-old organisation concessional consideration.

Yours faithfully,

Barry Wilton Secretary - Manager

We will keep you informed of future developments

**Have you advised the WIA
Executive office of your
new call sign?**

**Use the form on the reverse
of the amateur radio
address flysheet.**

5/8 wave

JENNIFER WARRINGTON VK5ANW

New Committees

Both Adelaide Hills Amateur Radio Society and the South Australian Packet Users Group have announced their new committees for 1992.

Adelaide Hills ARS

President
Secretary
Treasurer
Vice President
Committee Man
Public Officer

Geoff Taylor VK5TY
Trevor Gower VK5BE
Bryan Trott VK5PBT
Lloyd Butler VK5BR
Phil Day VK5OT
Jim Trapples VK5JT
Rob Gurr VK5RG

SAAPS

Austr'n Sprints (contests)
Examinations Officer
Examinations Officer
Historian
Broadcast Relay Co-ord
The Buy and Sell Sale Day will be co-ordinated by the Committee.

David Box VK5OV
Phil Day VK5OT
Hans Smith VK5XV
Lloyd Butler VK5BR
Ted MacKenzie VK5PEB

SAAPS

President
Vice President
Treasurer
Secretary
Committee Man
Ben Broadbent
Andrew McDade
Grant Willis
Arlis Adams
Peter

Maure Hopper VK5EA
Garry Herdson VK5ZK
Hans Smith VK5XV
Miles Lower VK5ALH
VK5ABE
VK5XK
VK5ZWI
VK5ZAR
VK5ZTX

Those of you who missed our speaker for February should be kicking yourselves. Colin McEwen VK5ZYK (formerly ZL2TFK from Hamilton NZ) gave an excellent talk with video, on the Klondyke Project, putting a repeater on Mt Egmont. I was particularly with the logistics of the thing.

Imagine a shopping list which read:
1 helicopter; 1 drilling rig; 1 bulldozer;
1x36-foot mast; 3 cement trucks; a bath of sulphuric acid and a trench digger! Fortunately, they were able to hire, borrow or beg most of the above, but the project still cost around \$30,000. Thanks Colin, for a most interesting talk. It is a pity that Peter Mad-

den VK5PRM could not be sure ahead of time that Colin would be available, so it could have been advertised on the broadcast.

As far as I am aware there was no speaker or any business meeting at the March general meeting night. I and several others waited for half an hour and then left, as nothing seemed to be happening. I realise problems do arise, but nobody seemed to be about to step into the breach or offer an explanation. I felt particularly sorry for at least one new member - there may have been others - who asked me "what happens tonight?" I told him what usually happens, but I think he would have been disappointed by the reality. It isn't a very good first impression for a "first-timer". I hope someone remembered to tell him to "come back next week" for the Buy and Sell night. I bet the place was packed out for that!

I ran into Joy VK5YJ while I was waiting. Joy was doing her annual job, trying to get WICEN volunteers for the Walk Against Want. Apparently, though, it had been made more difficult this year by the fact that the Berossa Picnic was to be held on the same day... I'll say no more, but there are a few red faces around! Picnic organisers (and others) please note, the date for next year's "Walk Against Want" is Sunday 28 March 1993.

Diary Dates

Next meeting Tuesday 26 May, 7.45pm at 34 West Thebarton Rd, Thebarton.

FTAC NOTES

JOHN MARTIN VK3ZJC FTAC
CHAIRMAN

Records

A new digital modes record for the 2m band has been set by Andrew Stewart VK1AS/2 and Bill Sinclair VK2ZCV for a series of packet contacts on 26 December 1991. This solidly beats the previous record for a RTTY contact between VK3ZQB and a certain other person. Congratulations to Andrew and Bill.

CLUB CORNER

South East Radio Group Inc

Well, folks, the time is fast approaching when that special weekend in June comes around. Of course I'm talking about the ever-popular South East Radio Group Annual Convention to be held over the weekend of 6-7 June 1992.

The South East Radio Group has set a standard for amateur conventions which is unsurpassed in Australia. A good balance is maintained between trade displays and competitions to ensure a wide range of tastes is catered for.

This year we are offering many exciting

events which include the Australian Fox Hunting Championships. However, additional emphasis is to be placed on the home brew competition. Traditionally, this competition may not have been very encouraging to beginners to the home brew arena, so this year we have created a number of sections to cater for the novice to expert. We hope this will encourage everyone who likes to dabble in home-built equipment to show their prowess and compete for some attractive prizemoney.

The South East Radio Group convention promises to be a very popular spot on the amateur calendar, so book your accommoda-

tion early to make sure you don't miss out. A list of recommended motels and caravan parks is available by writing to the Convention Coordinator at the address below.

Hope to see you there.
Convention Co-ordinator
SERG
PO Box 1103
Mt Gambier 5290

Oxley Region Amateur Radio Club Annual Field Day Weekend

Organisers of the Oxley Region Amateur Radio Club's annual field day weekend remind all interested amateurs, their families and friends that planning, which began

immediately after last year's event, is well down the track for this year's happening, scheduled for the Queen's Birthday weekend, Saturday and Sunday 7/7 June, 1992.

The venue, as in the previous two years, will be the Tacking Point Surf Lifesaving Pavilion, in Matthews Flinders Drive, at Lighthouse Beach, Port Macquarie. This has proven to be an excellent site, allowing most events to take place with minimal discomfort should the weather be unkind.

The usual attractions for this fun event, which include the various fox hunts, quizzes, competitions (home brew contest, radio throwing - for YLs/XYLs/ guess the resonant frequency, lucky door prizes etc) are again planned, with worthwhile trophies.

Registration begins at 10am on the Saturday and at 9am Sunday for those attending Sunday only. Registration fees: full weekend YLs/XYLs \$8, OMs \$12, family \$23. Sunday only: \$6, \$8 and \$16 respectively. A barbecue

luncheon on Sunday is included in the registration fee).

Tea, coffee and biscuits are provided free throughout both days, and a range of sandwiches will be available for purchase at the venue on Saturday at reasonable prices.

Enquiries to the secretary - Trevor VK2ZTT, (065) 85 2278 - or the president - Tracy VK2GTM (065) 85 7061. Written requests should be directed to The Secretary, ORARC, PO Box 712, Port Macquarie. ar

SILENT KEYS

DUE TO INCREASING SPACE DEMANDS OBITUARIES MUST BE NO LONGER THAN 200 WORDS.

The WIA regrets to announce the passing of:

C D (Colin)	Pryce	VK2KQX
A F (Alex)	Taylor	VK3AT
J F (Jack)	Elliott	VK3BZB
D H	Burrows	VK3BZC
J (James)	Stent	VK4SJA
J L (Jack)	Burke	VK5FZ
K (Ken)	Townsend	VK5PHT
F (Fenton)	Sanderson	VK6TS

Alex Taylor VK3AT

Alexander Francis Taylor was born at Rushworth, Victoria, 10 June 1917. He was granted his AOCF at the age of 17. Considering his chosen profession, his logbook reveals a very active amateur, all contacts being achieved on low powered homebrew equipment; a commercial transceiver not being obtained until 1975.

A member of the Wireless Institute since 1949, he was elected a member of the Old Timers Club in 1977.

Who's Who in the Commonwealth summarises his medical career - graduated in Melbourne 1941 with Bachelor of Science and Bachelor of Medicine; 1945 with Doctor of Gynaecology and Obstetrics. Appointed Resident Medical Officer for St Vincent's Hospital 1941, then for the Women's Hospital 1942, Captain, Australian Army Medical Corps 1943-44, Clinical Assistant, Royal Women's Hospital 1944-47, Honorary Obstetrician and Gynaecologist 1947-65, Consultant Obstetrician and Gynaecologist, Goulburn Valley Base Hospital, Shepparton, Victoria.

A humble, unassuming and caring man, whose other hobby - fishing - would be cancelled if a patient was to give birth. A man with a quick wit and sense of humour, who once said, "We should not be concerned with growing old; grow old to grow old was the problem."

Alex is survived by his wife Glenys, sons Peter and Ross, and daughters Glenys and Julie.

ARTHUR DUKE VK3DFA

Ken Townsend VK5PHT

It is with sadness that I advise my brother Ken passed away peacefully on 31 March 1992 at the age of 69 years.

Ken enlisted in the RAAF in World War II as a Wireless Air Gunner, and saw active service overseas in the Persian Gulf area and in the United Kingdom. Whilst in Persian Gulf areas he rescued a crew member of an aircraft which had crashed into the sea near the aerodrome, for which he was mentioned in Despatches. Subsequently he joined the PMG Department/Telecom, and retired in 1982. Ken spent the last four years of his life at the War Veterans' Home in South Australia, following a serious illness. He was active on two metres and 10 metres from the Home until a couple of days before his death. He is greatly missed by family and friends.

JACK TOWNSEND VK5HT

James Stent VK4SJA

Ex ZL3SR, ZL1BMQ, ZL2ATY, YJ8JS, VK8JS

With sadness, I wish to record the sudden and unexpected passing of my friend James on 3 February 1992.

James was first licensed in New Zealand in 1960 and moved to Vanuatu (then New Hebrides) in 1968 to take up an appointment as an air traffic controller. It was there that we became acquainted. James was particularly interested in RTTY, and most of his activity was confined to that mode.

James retired in 1982, moved to the Darwin area, but finally settled at Brisbane. Over the past few years his radio activities were concentrated on computers and satellite activities - particularly AO-10 and AO-13, mode B.

Jim is survived by his wife Marion.

HOW (HARRIS) VK4HRI

Jack Elliott VK3HZN

Jack passed away on 14 January 1992, aged 83.

Jack took on the challenge of amateur radio at the age of 68 in 1977, received his novice call that year (VK3NJK) and his full

call the following year. Jack was a staunch member of FAMPARC, attending all meetings for many years until night driving and ill health forced him to stop. However, he still renewed his membership every year.

Jack was also a member of Southern Peninsula Amateur Radio Club, the Yassu FT Club and the QRP Club, building several CW QRP rigs. A confirmed home brew amateur, his many finished and unfinished pieces of equipment attest to that fact. Jack's cheerfulness and humour will be greatly missed.

Gordon Buchanan VK3BGB

FAMPARC SECRETARY

C D (Col) Pryce VK2KQX

It is with deep regret that we record the passing of Colin Pryce VK2KQX of Port Macquarie. He passed away suddenly on 15 March 1992.

Col will be sadly missed by his many friends in the amateur radio fraternity.

Prior to VK2KQX, Col had held the call sign VK3VDD.

Sincere sympathy is extended to Col's wife and family in their time of grief.

Vale: Colin Pryce VK2KQX.

HENRY LUNDALL VK2ZHE

Alf Gooby VK4AAQ (ex VK3GV)

On 31 January 1982, Alf died, aged 77. He was born in Oakleigh, Victoria, in 1914. He had a colourful life, including employment in a clothing factory, oil refinery and as a racehorse transport driver, until he joined the Army Royal Corps of Signals from 1940 to 1945. After the war, he worked as a servo engine mechanic, OTC traffic assistant and counter officer, then 20 years as a TV serviceman, until he retired in 1975.

His electronics background started in 1921 (aged 7) when he built his first crystal set. By the time he was 14, he had sold his first broadcast receiver. He was licensed in 1935 as VK3GV, after getting his 2nd Class Operator's Certificate. His home-made wooden lattice 130ft radio mast at Glenroy was a landmark and aerial navigation aid for many years. Shortly after retiring, he came to Caloundra, where he eventually bought an acre of land. He was an ardent CW operator.

His other hobbies included astronomy and organ playing, and he had an extensive neat workshop. He was known for his quiet man-

ner and helpful advice, and will be sadly missed by the Sunshine Coast AR Club. We extend our sympathies to his wife Heather, his daughters Glenda and Carol, and grandchildren.

**VK4IS PRESIDENT
SUNSHINE COAST ARC**

OVER TO YOU

ALL LETTERS FROM MEMBERS WILL BE CONSIDERED FOR PUBLICATION BUT MUST BE LESS THAN 300 WORDS. THE WIA ACCEPTS NO RESPONSIBILITY FOR OPINIONS EXPRESSED BY CORRESPONDENTS.

Phantastic Phonetics

Listening around the DX bands of late, it has become apparent that something should be done about the standard of phonetics used. One operator may give as many as five or six different versions of phonetics in one CQ call. This, coupled often with a broad accent, does not always lend towards easy understanding. We can sympathise with the old timers who have the Able Baker etc routine so ingrained that nothing else can come out. They also had their resounding "Roger" changed to Romeo—a catastrophe.

Our complaint surely is with those afflicted with phonetic diarrhoea. To overcome this problem, or at least confuse them even more so than they confuse us, may I suggest the adoption of the following phonetic alphabet:

- A able
- B Babel
- C cable
- D day-bell*
- E enable
- F fable
- G Gable
- H hay-bell**
- I irritable
- J Jzebel
- K kapok
- L label
- M Mabel
- N Navel
- O operable
- P pay-bell
- Q quadragenarian
- R rateable
- S sable
- T table
- U unable
- V voonk
- W way-bell***
- X Xavier
- Y yee-bell***
- Z Zorro

* used in day-schools

** used by farmers distributing dry food

***nearly as obvious as P. - Navy stuff

****signifies "motion carried unanimously".

Confucius once said: "If conditions are bad enough to warrant the use of phonetics, re-

peat the same format slowly and clearly."

Seriously, though, how many times, under difficult conditions, have you tried to read a call which has been repeated quickly with continuing variations and given up hope of being able to understand him even if you did raise him?

**NEIL TRADNER VK3LJ
133 BLAISEN ST
LAVERTON 3028**

Callbook Revisted?

Remember the 1986/87 Australian Radio Amateur Callbook?

That was the one that identified WIA members with the "I" mark against their callign. I also remember that this caused a bit of an uproar, mainly from non-WIA members. Six years on, and having just got into the business of QSLing due to my 6m SSB contacts, I now think back—what a good idea was.

If QSLing to another WIA member, cards could be sent via "The Bureau", rather than sending them "direct" via Australia Post, which can be a very expensive exercise after a while, particularly if you send out a dozen or so cards at a time—each with an SASE enclosed. I make the assumption here that a WIA member has bothered to register with his/her Divisional QSL Bureau and, considering it doesn't cost any extra, why not?

How about the re-introduction of this feature to future editions of the callbook?

Comments anyone?

**ADAM MAUER VK3YVW
1 JEREMY STREET
DANDENONG NORTH 3176**

Ten Metre Pirates

During the past few years I and other writers have drawn attention to the extensive pirating of the 10m band by Asians.

During 1990 I ran a series of DF measurements on these stations using an Adcock DF system I had built. Although HF direction finding is subject to errors, these tend to average out. I was able to establish the bearing was through the northern part of the Indonesian archipelago—primarily Sumatra.

This and other evidence leads me to conclude that the signals were coming from this region. Quite recently, the conference of Region 3 IARU was held in Indonesia.

However, in the conference report published in AR, I can find no specific mention of the 10m pirate problem which, in the circumstances, seems rather surprising. Let us hope Region 3 IARU addresses this matter in the not-too-distant future. For anyone interested, details of my 10m Adcock DF system can be had by writing (QTH).

Adcock finders located in Darwin and Port Moresby, Cairns or Townsville could pinpoint the pirates with adequate accuracy.

**IAN F BERNICK VK3ALZ
107 LOONGANA AVE
GLADEBROT 3046**

Codeless Novice

I read in the WIA News segment of AR for March 1992 that yet another novice licence is appearing on the horizon. Where will this end? It appears to me that the amateur licence structure is rapidly becoming a citizens band type, is pay your money then go and operate; no examination, of course.

When the novice licence was introduced it was intended to get people on the air whilst studying for either limited or full call licences. Due to the limited privileges of the novice licence, there was an incentive to obtain the higher licence grades. Then the novice privileges were extended to the point where a novice now has most of the full call privileges. Where is the incentive to upgrade? Call me old fashioned, but I believe an amateur licence is earned—not handed to one.

With this new novice licence the cycle will start all over again. Limited privileges at first, pressure groups forming, privileges extended again, as occurred with the present novice classes.

I have held a limited call since 1976 and would love to upgrade to a full call, but I have a problem learning CW. The incentive is still there to obtain the full call and, when obtained, I will feel I have earned my full call.

**LES PARKER VK4ZLP
22 AUCLAND ST
WHEATBELT 4128**

Forty at Night

While I was a novice operator I believed the 40m band was the sacred haven of the "old timer" or the retired ham wireless person who operated on this band only during the daylight hours. Unfortunately that impression has remained with me even when I found myself qualified to venture, with some trepidation, on to the 40m segment of the bands.

This has now changed. The recent contest held over 14/15 March indicated to me there are many amateurs who just do not get on to 40 metres at all.

Come on, amateur operators, fire up those rigs! On Saturday night last, I copied 57-59 signals from VK4, VK5, VK6 and ZL, all on 40 metres. My falsely based belief that this band was the haven of one group of people within the hobby, during the daylight hours only, was finally shattered, and I am thankful that it has been shattered.

While 80 metres is noisy and crowded, 40 metres provides us with a reliable band for VK and ZL contacts. Let's see this band spring to life as we begin to establish and re-establish friendships once lost among the noise of 80 metres.

**GRAHAM GALL VK3ZS
76 GREENWOOD DR
BUNDORA 3083**

Link Link

Oh "fabulous joy" when I received a complimentary copy of the March issue of AR under the above reference.

Then, what a sinking, intestine-twisting feeling when I realised that article on **Lan Link** had an error, and that it was my **mis-lake!**

Sackcloth and ashes department.

Living with **Lan-Link**, **AR** March 1992, pp 20 & 21, Section 2, Editing the Operating Files.

The last sentence in the last paragraph should read ... "The **FILE** menu allows for easy file deletion/erasure, **ESC F E** filename **ENTER**."

The source of the error was in my keeping drafts containing errors which had been corrected elsewhere, and not double checking.

Apologies from the author.

DENNIS W AWARD VK4ADY
11 JAMES ST
LAIDLEY 4341

Metric Only

Congratulations on the continuing high standard of **AR**. I have a suggestion for editorial policy to maintain **AR**'s generally excellent image.

About 20 years ago, most of Australia adopted metric measurements. I now find it hard to visualise or think in the old measures, and I have few remaining instruments with

which to measure them.

Perhaps more important than my personal plight, however, we now have a whole generation of people who have probably never learned imperial measurements at school - lucky things!

After 20 years, maybe it's time to eliminate, or at least reduce, imperial measurements to "optional, secondary" status throughout the magazine, even on imported copy. After all, doesn't it say somewhere ... "The amateur is progressive ..."

NORM MELFORD VK3ZTN
OLD COOMARA RD
DIARRA 5788

(I thought the latter was our policy, Norm, ie to give metric measurements first and imperial second, if at all. We will try to do it more thoroughly from now on! - Ed).

Coral Sea Battle

Regarding the Coral Sea commemoration by Townsville ABC.

My purpose is to awaken some interest and respect for the part played by wireless telegraphists (WT) in that and many other battles. Without them the flow of information between participants and commands would not have been possible. Their presence is mostly ignored, even by the history books. The fol-

lowing extract from the official **Royal Australian Air Force 1939-1942** is typical:

"The crew listened for more than two hours to reports of further assaults by both bombers and fighters" - not a word about the fact that the reports were signalled in Morse telegraphy, copied at the aircraft's **W/T** desk and distributed as handwritten notes to captain and crew.

The part played by those unsung participants could be publicised on the occasion of the 50th anniversary of the Coral Sea, and who better than members of the "wireless" fraternity. Mention in **AR** and divisional broadcasts would be appropriate. Many were pre-war amateurs and many joined our fraternity after the war. But, please show the respect which is their due, and stick to the truth. I suggest a Coral Sea item on every Divisional broadcast on 3 and 10 May.

The truth is contained in official histories such as chapter 26 of **Royal Australian Air Force 1939-1942** by Douglas Gillison.

LINDSAY LAWLESS VK3ANJ
PO Box 112
LAKES ENTRANCE 3803

(In an accompanying letter to VK4CD, Lindsay describes some of his "hair raising" experiences in RAAF Catalinas during that epic battle. - Ed).

ar

Early birds catch worms... but at the S.E.R.G.convention amateurs can catch bargains that even the worms won't believe!

but only for one day, and only for personal shoppers, Saturday June 6th from 10:00am, at the Mt. Gambier showgrounds. See you there!

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ICOM **KENWOOD**  **Cushcraft** CORPORATION

Stewart Electronic Components Pty. Ltd.

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FAX (03)543-7238

HF PREDICTIONS

ROGER HARRISON VK2ZTB - THE APOGES GROUP

The general band conditions begin to change this month as we move away from the autumn equinox into winter. The solar cycle is maintaining high sunspot numbers still, so propagation on the bands 10 MHz and above remains good when conditions are generally quiet (no solar flares or geomagnetic disturbances). The value of the yearly smoothed sunspot number used to generate this month's charts was 94.

The Tables Explained

The tables provide estimates of signal strength for each hour of the UTC day for the five bands from 14 to 28 MHz. The UTC hour is the first column, the second column lists the predicted MUF (maximum usable frequency), the third column the signal strength in dB relative to 1 µV (dBu) at the MUF. The fourth column lists the "frequency of optimum travel" (FOT), or the optimum working frequency, as it is more generally known.

The signal strengths are all shown in dB relative to a reference of 1 pV in 50 Ohms at

the receiver antenna input. The table below relates these figures to the amateur S-point 'standard' where S9 is 50 µV at the receiver's input and the S-meter scale is 6 dB/S-point.

pV in 50 Ohms	S-points	dB(µV)
50.00	99	34
25.00	98	28
12.50	97	22
6.25	96	16
3.12	95	10
1.56	94	4
0.78	93	-2
0.39	92	-8
0.2	91	-14

The tables are generated by the Graph-DX program, assuming 100 W transmit power output, modest beam antennas (eg three-element Yagi or cubical quad) and a short-term forecast of the sunspot number. Actual solar and geomagnetic activity will affect results observed.

The three regions cover stations within the

following areas:

VK EAST. The major part of NSW and Queensland.

VK SOUTH. Southern-NSW, VK3, VK5 and VK7.

VK WEST. The south-west of West Australia.

Likewise, the overseas terminals cover substantial regions; eg "Europe" covers most of western Europe and the UK.

Graph-DX is written in the C language and runs on any IBM PC AT/XT or compatible computer with EGA, Hercules or VGA adapter and screen. Professional and Amateur versions are available.

Enquires to FT Promotions, PO Box 306, Woolahra NSW 2025.

Prevent pirates - make sure you sell your transmitter to a licensed amateur.

UTC	MUF	dBu	FOT	14.2	18.1	21.2	24.9	28.5
1 19.0	8	15.6	2	6	5	1	1	7
2 17.8	8	15.3	2	6	5	1	1	7
3 16.6	8	15.0	2	6	5	1	1	7
4 15.4	8	14.7	2	6	5	1	1	7
5 14.2	8	14.4	2	6	5	1	1	7
6 13.0	8	14.1	2	6	5	1	1	7
7 11.8	8	13.8	2	6	5	1	1	7
8 10.6	8	13.5	2	6	5	1	1	7
9 9.4	8	13.2	2	6	5	1	1	7
10 8.2	8	12.9	2	6	5	1	1	7
11 7.0	8	12.6	2	6	5	1	1	7
12 5.8	8	12.3	2	6	5	1	1	7
13 4.6	8	12.0	2	6	5	1	1	7
14 3.4	8	11.7	2	6	5	1	1	7
15 2.2	8	11.4	2	6	5	1	1	7
16 1.0	8	11.1	2	6	5	1	1	7
17 0.8	8	10.8	2	6	5	1	1	7
18 0.6	8	10.5	2	6	5	1	1	7
19 0.4	8	10.2	2	6	5	1	1	7
20 0.2	8	9.9	2	6	5	1	1	7
21 0.0	8	9.6	2	6	5	1	1	7
22 0.0	8	9.3	2	6	5	1	1	7
23 0.0	8	9.0	2	6	5	1	1	7
24 0.0	8	8.7	2	6	5	1	1	7
25 0.0	8	8.4	2	6	5	1	1	7
26 0.0	8	8.1	2	6	5	1	1	7
27 0.0	8	7.8	2	6	5	1	1	7
28 0.0	8	7.5	2	6	5	1	1	7
29 0.0	8	7.2	2	6	5	1	1	7
30 0.0	8	6.9	2	6	5	1	1	7

UTC	MUF	dBu	FOT	14.2	18.1	21.2	24.9	28.5
1 19.0	14	13.0	15	14	10	2	7	0
2 17.8	14	12.7	15	14	10	2	7	0
3 16.6	14	12.4	15	14	10	2	7	0
4 15.4	14	12.1	15	14	10	2	7	0
5 14.2	14	11.8	15	14	10	2	7	0
6 13.0	14	11.5	15	14	10	2	7	0
7 11.8	14	11.2	15	14	10	2	7	0
8 10.6	14	10.9	15	14	10	2	7	0
9 9.4	14	10.6	15	14	10	2	7	0
10 8.2	14	10.3	15	14	10	2	7	0
11 7.0	14	10.0	15	14	10	2	7	0
12 5.8	14	9.7	15	14	10	2	7	0
13 4.6	14	9.4	15	14	10	2	7	0
14 3.4	14	9.1	15	14	10	2	7	0
15 2.2	14	8.8	15	14	10	2	7	0
16 1.0	14	8.5	15	14	10	2	7	0
17 0.8	14	8.2	15	14	10	2	7	0
18 0.6	14	7.9	15	14	10	2	7	0
19 0.4	14	7.6	15	14	10	2	7	0
20 0.2	14	7.3	15	14	10	2	7	0
21 0.0	14	7.0	15	14	10	2	7	0
22 0.0	14	6.7	15	14	10	2	7	0
23 0.0	14	6.4	15	14	10	2	7	0
24 0.0	14	6.1	15	14	10	2	7	0
25 0.0	14	5.8	15	14	10	2	7	0
26 0.0	14	5.5	15	14	10	2	7	0
27 0.0	14	5.2	15	14	10	2	7	0
28 0.0	14	4.9	15	14	10	2	7	0
29 0.0	14	4.6	15	14	10	2	7	0
30 0.0	14	4.3	15	14	10	2	7	0

UTC	MUF	dBu	FOT	14.2	18.1	21.2	24.9	28.5
1 16.7	18	12.7	22	16	8	4	3	-17
2 15.5	18	12.4	22	16	8	4	3	-17
3 14.3	18	12.1	22	16	8	4	3	-17
4 13.1	18	11.8	22	16	8	4	3	-17
5 11.9	18	11.5	22	16	8	4	3	-17
6 10.7	18	11.2	22	16	8	4	3	-17
7 9.5	18	10.9	22	16	8	4	3	-17
8 8.3	18	10.6	22	16	8	4	3	-17
9 7.1	18	10.3	22	16	8	4	3	-17
10 5.9	18	10.0	22	16	8	4	3	-17
11 4.7	18	9.7	22	16	8	4	3	-17
12 3.5	18	9.4	22	16	8	4	3	-17
13 2.3	18	9.1	22	16	8	4	3	-17
14 1.1	18	8.8	22	16	8	4	3	-17
15 0.9	18	8.5	22	16	8	4	3	-17
16 0.7	18	8.2	22	16	8	4	3	-17
17 0.5	18	7.9	22	16	8	4	3	-17
18 0.3	18	7.6	22	16	8	4	3	-17
19 0.1	18	7.3	22	16	8	4	3	-17
20 0.0	18	7.0	22	16	8	4	3	-17
21 0.0	18	6.7	22	16	8	4	3	-17
22 0.0	18	6.4	22	16	8	4	3	-17
23 0.0	18	6.1	22	16	8	4	3	-17
24 0.0	18	5.8	22	16	8	4	3	-17
25 0.0	18	5.5	22	16	8	4	3	-17
26 0.0	18	5.2	22	16	8	4	3	-17
27 0.0	18	4.9	22	16	8	4	3	-17
28 0.0	18	4.6	22	16	8	4	3	-17
29 0.0	18	4.3	22	16	8	4	3	-17
30 0.0	18	4.0	22	16	8	4	3	-17

VK EAST - MEDITERRANEAN

VK STH - MEDITERRANEAN

VK WEST - MEDITERRANEAN

UTC	MUF	dBu	FOT	14.2	18.1	21.2	24.9	28.5
1 17.3	15	11.7	13	15	9	1	0	0
2 16.1	15	11.4	13	15	9	1	0	0
3 14.9	15	11.1	13	15	9	1	0	0
4 13.7	15	10.8	13	15	9	1	0	0
5 12.5	15	10.5	13	15	9	1	0	0
6 11.3	15	10.2	13	15	9	1	0	0
7 10.1	15	9.9	13	15	9	1	0	0
8 8.9	15	9.6	13	15	9	1	0	0
9 7.7	15	9.3	13	15	9	1	0	0
10 6.5	15	9.0	13	15	9	1	0	0
11 5.3	15	8.7	13	15	9	1	0	0
12 4.1	15	8.4	13	15	9	1	0	0
13 2.9	15	8.1	13	15	9	1	0	0
14 1.7	15	7.8	13	15	9	1	0	0
15 0.5	15	7.5	13	15	9	1	0	0
16 0.3	15	7.2	13	15	9	1	0	0
17 0.1	15	6.9	13	15	9	1	0	0
18 0.0	15	6.6	13	15	9	1	0	0
19 0.0	15	6.3	13	15	9	1	0	0
20 0.0	15	6.0	13	15	9	1	0	0
21 0.0	15	5.7	13	15	9	1	0	0
22 0.0	15	5.4	13	15	9	1	0	0
23 0.0	15	5.1	13	15	9	1	0	0
24 0.0	15	4.8	13	15	9	1	0	0
25 0.0	15	4.5	13	15	9	1	0	0
26 0.0	15	4.2	13	15	9	1	0	0
27 0.0	15	3.9	13	15	9	1	0	0
28 0.0	15	3.6	13	15	9	1	0	0
29 0.0	15	3.3	13	15	9	1	0	0
30 0.0	15	3.0	13	15	9	1	0	0

JTC	MUF	dBu	FOT	14.2	18.1	21.2	24.9	28.5
1	18.1	10	11.2	9	9	5	-3	-18
2	15.6	10	10.7	14	11	5	-5	-18
3	14.9	18	10.4	18	12	4	-5	-18
4	13.7	20	10.2	20	14	5	-5	-18
5	12.5	22	10.0	22	12	5	-12	-29
6	11.3	25	10.4	26	18	5	-10	-26
7	10.1	28	10.2	30	20	5	-10	-26
8	8.9	30	10.0	32	22	5	-10	-26
9	7.7	16	10.5	19	14	6	-5	-19
10	6.5	11	11.1	11	6	-2	-15	-31
11	5.3	8	9.7	7	5	-2	-10	-24
12	4.1	-4	8.8	1	-2	-10	-24	-38
13	2.9	-11	8.4	-4	-3	-10	-23	-38
14	1.7	-18	8.4	-10	-5	-10	-23	-38
15	0.5	-28	8	-10	-5	-13	-25	-54
16	0.3	-35	8.1	-20	-16	-20	-32	-
17	0.1	-42	7.8	-32	-26	-31	-	-
18	0.0	-49	7.6	-35	-27	-	-	-
19	0.0	-56	7.6	-35	-27	-	-	-
20	0.0	-63	8.7	-17	-18	-	-	-
21	0.0	-70	8.7	-17	-18	-	-	-
22	0.0	-77	-12	11	-8	-1	-2	-30
23	0.0	-84	5	15.9	18	-4	-5	-30
24	0.0	-91	1	15.1	-1	-2	0	-5
25	0.0	-98	7	7	-7	-2	-	-
26	0.0	-105	6	11.7	2	6	-1	-19

[illegible]

UTC	PLF	OSU	FOT	14.2	18	1	21	24	24	9	26
1	10	8	5	1	1	1	1	1	1	1	1
2	10	15	0.3	9	-4	-19	-	-	-	-	-
3	16	12	10	4	12	6	2	-17	-	-33	-
4	16	2	12	6	1	19	-	-	-	-	-
5	26.8	9	19	5	12	12	9	-	-	-	-
6	26.8	8	21	4	2	11	12	10	4	-	-
7	25.6	8	20	5	1	10	11	7	-	-	-
8	26.8	1	1	4	1	11	11	7	-	-	-
9	21	9	17.5	7	1	10	10	4	-13	-	-
10	18.3	1	10	15	1	11	7	0	11	-	-
11	16	1	11	1	1	11	7	0	11	-	-
12	16.4	4	12	11	2	12	5	4	19	-	-
13	12.7	15	9	8	13	1	11	-31	-	-	-
14	12.7	21	11	1	1	11	7	0	11	-	-
15	11.7	2	25	6	14	5	24	-	-	-	-
16	11	0	28	8.5	14	6	-27	-	-	-	-
17	9	29	1	1	1	11	7	0	11	-	-
18	10	8	5	0	8.2	13	-9	-51	-	-	-
19	19	1	50	7.9	11	13	-56	-	-	-	-
20	19	1	7	6	8	11	7	0	11	-	-
21	9	31	7	8	10	-15	-38	-	-	-	-
22	10	3	8	0	15	10	52	-	-	-	-
23	10	3	7	9	9	11	-58	-	-	-	-
24	10	0	7	7	9	-12	-52	-	-	-	-

UTC	MSF	000	POT	14	2	16	1	21	2	24	9	28	5
1	2	10	17	8	5	11	5	-13	-5				
2	10	17	8	5	11	5	5	-21					
3	16	0	15	10	5	3	13	-3	18			36	
4	20	12	15	8	12	14	11	5	18			-6	
5	20	12	15	8	12	14	11	5	18			-6	
6	26	7	20	2	2	11	12	5	10	8	5		
7	26	7	20	2	2	11	12	5	10	8	5		
8	19	7	18	1	1	10	11	1	6				
9	26	7	18	1	1	10	11	1	6				
10	21	11	18	14	5	1	11	10	1			3	0
11	11	11	18	14	5	1	11	10	1			3	0
12	16	5	15	13	5	14	10	3	-9	-24			
13	14	1	17	10	5	16	7		21				
14	11	1	17	10	5	16	7		21				
15	11	3	26	8	5	16	3	22					
16	10	7	20	7	9	14	-7	-28					
17	50	7	20	7	9	14	-7	-28					
18	10	6	51	7	8	15	-8	-30					
19	10	6	52	7	9	15	-8	-30					
20	10	4	35	7	6	12	-12	-35					
21	9	4	35	7	6	12	-12	-35					
22	9	6	35	7	6	10	-16						
23	10	4	32	7	9	10	-11	-31					
24	10	4	32	7	9	10	-11	-31					

VK EAST - AFRICA

UTC	FLS	FOT	14	2	18	21	24	28
1	28 0	11 22 1	4	15	17	16	25	18
2	29 1	11 22 6	4	14	16	15	15	
3	29 4	11 22 5	3	14	16	15	15	
4	29 6	11 22 4	3	14	16	15	15	
5	29 15	11 22 5	7	16	18	18	17	11
6	29 22	11 22 5	11	19	19	17	17	11
7	29 27	11 22 5	12	20	19	17	17	11
8	29 31	11 22 5	12	20	19	17	17	11
9	29 35	11 22 5	12	20	19	17	17	11
10	29 38	11 22 5	12	20	19	17	17	11
11	29 41	11 22 5	12	20	19	17	17	11
12	29 44	11 22 5	12	20	19	17	17	11
13	29 47	11 22 5	12	20	19	17	17	11
14	29 50	11 22 5	12	20	19	17	17	11
15	29 53	11 22 5	12	20	19	17	17	11
16	29 56	11 22 5	12	20	19	17	17	11
17	29 59	11 22 5	12	20	19	17	17	11
18	30 02	11 22 5	12	20	19	17	17	11
19	30 05	11 22 5	12	20	19	17	17	11
20	30 08	11 22 5	12	20	19	17	17	11
21	30 11	11 22 5	12	20	19	17	17	11
22	30 14	11 22 5	12	20	19	17	17	11
23	30 17	11 22 5	12	20	19	17	17	11
24	30 20	11 22 5	12	20	19	17	17	11
25	30 23	11 22 5	12	20	19	17	17	11
26	30 26	11 22 5	12	20	19	17	17	11
27	30 29	11 22 5	12	20	19	17	17	11
28	30 32	11 22 5	12	20	19	17	17	11
29	30 35	11 22 5	12	20	19	17	17	11
30	30 38	11 22 5	12	20	19	17	17	11
31	30 41	11 22 5	12	20	19	17	17	11
32	30 44	11 22 5	12	20	19	17	17	11
33	30 47	11 22 5	12	20	19	17	17	11
34	30 50	11 22 5	12	20	19	17	17	11
35	30 53	11 22 5	12	20	19	17	17	11
36	30 56	11 22 5	12	20	19	17	17	11
37	30 59	11 22 5	12	20	19	17	17	11
38	31 02	11 22 5	12	20	19	17	17	11
39	31 05	11 22 5	12	20	19	17	17	11
40	31 08	11 22 5	12	20	19	17	17	11
41	31 11	11 22 5	12	20	19	17	17	11
42	31 14	11 22 5	12	20	19	17	17	11
43	31 17	11 22 5	12	20	19	17	17	11
44	31 20	11 22 5	12	20	19	17	17	11
45	31 23	11 22 5	12	20	19	17	17	11
46	31 26	11 22 5	12	20	19	17	17	11
47	31 29	11 22 5	12	20	19	17	17	11
48	31 32	11 22 5	12	20	19	17	17	11

VK STH - AFRICA

UTC	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
1	29	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	25	4	9	18	7	5	1	11	12	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	25	4	9	19	2	1	10	12	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	25	4	9	19	4	0	10	12	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	25	4	9	19	2	0	10	12	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	26	4	7	10	18	6	13	13	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	26	4	7	10	18	6	13	13	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	21	2	15	16	0	19	18	15	5	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	18	6	17	14	1	17	17	17	9	-4	-19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	13	9	10	12	2	17	17	17	17	-18	-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	13	9	21	10	5	20	2	-13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	13	9	23	9	2	5	-10	-33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	13	9	23	9	2	5	-10	-33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	10	7	28	0	0	7	-37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	10	7	28	0	0	7	-37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	10	7	28	0	0	7	-37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	10	7	28	0	0	7	-37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	9	9	25	7	5	-4	-39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	9	9	26	7	0	-12	-39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	9	9	26	7	0	-12	-39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	11	5	24	8	9	-9	-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	15	9	11	12	5	15	6	-6	-20	-38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	15	9	11	12	5	15	6	-6	-20	-38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	20	5	17	17	6	12	11	7	-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	23	2	0	17	7	6	12	11	7	-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

VK WEST - AFRIC

[illegible]

VK EAST - ASIA

[illegible]

VK_STH - ASIA

JTC	MUS	RU	FOT	14	2	18	21	27	24	9	28
2	23	15	17	21	18	21	17	9			
2	25	7	15	17	22	22	18	10			
2	25	16	14	17	22	22	18	10			
5	21	15	17	15	26	26	19	19			
5	21	17	10	6	30	25	18	8			
6	19	5	21	14	7	35	25	15	1	-1	
8	15	5	21	14	7	35	25	15	1	-1	
8	15	5	21	14	7	35	25	15	1	-1	
9	15	5	21	14	7	35	25	15	1	-1	
9	15	5	21	14	7	35	25	15	1	-1	
10	15	5	21	14	7	35	25	15	1	-1	
10	15	5	21	14	7	35	25	15	1	-1	
11	10	9	31	8	1	13	-14				
11	10	9	31	8	1	13	-14				
12	10	9	31	8	1	13	-14				
14	9	3	33	6	9	1	-12				
15	9	3	33	6	9	1	-12				
15	9	3	33	6	9	1	-12				
16	8	6	35	6	6	-1	36				
17	8	6	35	6	6	-1	36				
18	8	6	35	6	6	-1	36				
19	8	6	35	6	6	-1	36				
20	8	6	35	6	6	-1	36				
21	13	23	25	8	0	6	-19				
22	13	23	25	8	0	6	-19				
23	13	23	25	8	0	6	-19				
24	13	23	25	8	0	6	-19				
25	20	18	10	7	5	-11	-53				
26	20	18	10	7	5	-11	-53				
27	20	18	10	7	5	-11	-53				
28	20	18	10	7	5	-11	-53				
29	20	18	10	7	5	-11	-53				
30	20	18	10	7	5	-11	-53				
31	20	18	10	7	5	-11	-53				
32	20	18	10	7	5	-11	-53				
33	20	18	10	7	5	-11	-53				
34	20	18	10	7	5	-11	-53				
35	20	18	10	7	5	-11	-53				
36	20	18	10	7	5	-11	-53				
37	20	18	10	7	5	-11	-53				
38	20	18	10	7	5	-11	-53				
39	20	18	10	7	5	-11	-53				
40	20	18	10	7	5	-11	-53				
41	20	18	10	7	5	-11	-53				
42	20	18	10	7	5	-11	-53				

VK WEST - ASIA

UTC	PL	dB	POT	14	18	21	24	28	5
2 28 17	10	20	5	12	17	15	8	9	
2 28 33	10	21	5	12	17	18	15	8	
3 28 09	10	22	6	11	18	20	15	8	
3 28 25	10	22	6	11	18	20	15	8	
5 27 09	12	21	5	19	23	25	17	11	
5 27 25	15	19	5	27	26	25	18	11	
5 27 41	15	19	5	27	26	25	18	11	
8 27 05	22	15	5	37	28	20	14	8	
8 27 21	22	15	5	37	28	20	14	8	
9 18 11	26	13	6	36	24	16	-1	-15	
9 18 27	26	13	6	36	24	16	-1	-15	
11 13 06	10	20	5	28	11	-1	-26	-32	
12 12 05	21	9	5	24	6	-1	-26	-32	
13 11 08	21	9	5	24	6	-1	-26	-32	
13 11 24	21	9	5	24	6	-1	-26	-32	
15 11 11	5	0	4	-2	-2	-25			
16 11 12	5	0	4	-2	-2	-25			
16 11 28	5	0	4	-2	-2	-25			
17 10 28	26	9	3	19	-5	-32			
18 10 12	26	7	8	15	-6	-37			
19 10 10	32	7	6	9	-11	-54			
20 10 00	32	7	6	9	-11	-54			
21 12 06	19	9	2	16	3	-11	-31		
22 11 02	15	13	1	17	13	5	-6	-21	
22 11 18	15	13	1	17	13	5	-6	-21	
24 22 05	11	19	2	13	17	16	11		

VK EAST - STH PACIFIC

JTC	MU	du	FOT	2	18	1	2	26	9	28
1	27	5	22	1	17	0	21	6	11	6
2	27	5	10	22	5	4	11	6	11	6
3	27	5	17	19	4	18	21	6	11	6
4	27	5	20	18	7	30	28	24	15	1
5	27	5	20	18	7	30	28	24	15	1
6	27	5	21	17	8	30	28	24	15	1
7	27	5	22	16	0	57	21	11	6	11
8	27	5	22	16	0	57	21	11	6	11
9	27	5	22	16	0	57	21	11	6	11
10	27	5	22	16	0	57	21	11	6	11
11	27	5	22	16	0	57	21	11	6	11
12	27	5	22	16	0	57	21	11	6	11
13	27	5	22	16	0	57	21	11	6	11
14	27	5	22	16	0	57	21	11	6	11
15	27	5	22	16	0	57	21	11	6	11
16	27	5	22	16	0	57	21	11	6	11
17	27	5	22	16	0	57	21	11	6	11
18	27	5	22	16	0	57	21	11	6	11
19	27	5	22	16	0	57	21	11	6	11
20	27	5	22	16	0	57	21	11	6	11
21	27	5	22	16	0	57	21	11	6	11
22	27	5	22	16	0	57	21	11	6	11
23	27	5	22	16	0	57	21	11	6	11
24	27	5	22	16	0	57	21	11	6	11
25	27	5	22	16	0	57	21	11	6	11
26	27	5	22	16	0	57	21	11	6	11
27	27	5	22	16	0	57	21	11	6	11
28	27	5	22	16	0	57	21	11	6	11
29	27	5	22	16	0	57	21	11	6	11
30	27	5	22	16	0	57	21	11	6	11
31	27	5	22	16	0	57	21	11	6	11
32	27	5	22	16	0	57	21	11	6	11
33	27	5	22	16	0	57	21	11	6	11
34	27	5	22	16	0	57	21	11	6	11
35	27	5	22	16	0	57	21	11	6	11
36	27	5	22	16	0	57	21	11	6	11
37	27	5	22	16	0	57	21	11	6	11
38	27	5	22	16	0	57	21	11	6	11
39	27	5	22	16	0	57	21	11	6	11
40	27	5	22	16	0	57	21	11	6	11
41	27	5	22	16	0	57	21	11	6	11
42	27	5	22	16	0	57	21	11	6	11
43	27	5	22	16	0	57	21	11	6	11
44	27	5	22	16	0	57	21	11	6	11
45	27	5	22	16	0	57	21	11	6	11
46	27	5	22	16	0	57	21	11	6	11
47	27	5	22	16	0	57	21	11	6	11
48	27	5	22	16	0	57	21	11	6	11
49	27	5	22	16	0	57	21	11	6	11
50	27	5	22	16	0	57	21	11	6	11
51	27	5	22	16	0	57	21	11	6	11
52	27	5	22	16	0	57	21	11	6	11
53	27	5	22	16	0	57	21	11	6	11
54	27	5	22	16	0	57	21	11	6	11
55	27	5	22	16	0	57	21	11	6	11
56	27	5	22	16	0	57	21	11	6	11
57	27	5	22	16	0	57	21	11	6	11
58	27	5	22	16	0	57	21	11	6	11
59	27	5	22	16	0	57	21	11	6	11
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63	27	5	22	16	0	57	21	11	6	11
64	27	5	22	16	0	57	21	11	6	11
65	27	5	22	16	0	57	21	11	6	11
66	27	5	22	16	0	57	21	11	6	11
67	27	5	22	16	0	57	21	11	6	11
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75	27	5	22	16	0	57	21	11	6	11
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94	27	5	22	16	0	57	21	11	6	11
95	27	5	22	16	0	57	21	11	6	11
96	27	5	22	16	0	57	21	11	6	11
97	27	5	22	16	0	57	21	11	6	11
98	27	5	22	16	0	57	21	11	6	11
99	27	5	22	16	0	57	21	11	6	11
100	27	5	22	16	0	57	21	11	6	11

VK STH - STH PACIFIC

UTC	MUF	3000	FOT	14.2	18	21	24	30
2:28.5	7	23.1	-15	2	8	15	20	20
2:29.5	10	22.2	-15	2	8	15	15	15
2:30.5	14	21.3	-10	18	19	19	19	19
2:31.5	18	20.8	23	25	26	26	20	20
2:32.5	19	19.9	52	50	50	26	20	20
2:33.5	20	19.9	52	50	50	26	20	20
2:34.5	21	15.7	37	31	31	26	20	20
2:35.5	21	15.7	37	31	31	26	20	20
2:36.5	18	13.5	54	54	16	0	-1	-1
2:37.5	15	13.5	54	54	16	0	-1	-1
2:38.5	10	9.9	25	20	17	6	-28	-28
2:39.5	11	9.0	21	21	17	5	59	59
2:40.5	12	9.0	21	21	17	5	59	59
2:41.5	13	9.0	21	21	17	5	59	59
2:42.5	14	9.0	21	21	17	5	59	59
2:43.5	15	8.5	13	13	15	-19	37	37
2:44.5	16	8.5	9	9	1	17	-36	-36
2:45.5	17	8.5	9	9	1	17	-36	-36
2:46.5	18	7.7	0	0	7	18	-29	-29
2:47.5	19	7.7	0	0	7	18	-29	-29
2:48.5	20	7.7	0	0	7	18	-29	-29
2:49.5	21	7.7	0	0	7	18	-29	-29
2:50.5	22	13.0	12	1	1	-5	-1	-1
2:51.5	23	12.2	18	1	1	2	1	1
2:52.5	24	12.2	18	1	1	2	1	1
2:53.5	25	12.2	18	1	1	2	1	1
2:54.5	26	12.2	18	1	1	2	1	1
2:55.5	27	12.2	18	1	1	2	1	1
2:56.5	28	12.2	18	1	1	2	1	1
2:57.5	29	12.2	18	1	1	2	1	1
2:58.5	30	12.2	18	1	1	2	1	1
2:59.5	31	12.2	18	1	1	2	1	1
3:00.5	32	12.2	18	1	1	2	1	1
3:01.5	33	12.2	18	1	1	2	1	1
3:02.5	34	12.2	18	1	1	2	1	1
3:03.5	35	12.2	18	1	1	2	1	1
3:04.5	36	12.2	18	1	1	2	1	1
3:05.5	37	12.2	18	1	1	2	1	1
3:06.5	38	12.2	18	1	1	2	1	1
3:07.5	39	12.2	18	1	1	2	1	1
3:08.5	40	12.2	18	1	1	2	1	1
3:09.5	41	12.2	18	1	1	2	1	1
3:10.5	42	12.2	18	1	1	2	1	1
3:11.5	43	12.2	18	1	1	2	1	1
3:12.5	44	12.2	18	1	1	2	1	1
3:13.5	45	12.2	18	1	1	2	1	1
3:14.5	46	12.2	18	1	1	2	1	1
3:15.5	47	12.2	18	1	1	2	1	1
3:16.5	48	12.2	18	1	1	2	1	1
3:17.5	49	12.2	18	1	1	2	1	1
3:18.5	50	12.2	18	1	1	2	1	1
3:19.5	51	12.2	18	1	1	2	1	1
3:20.5	52	12.2	18	1	1	2	1	1
3:21.5	53	12.2	18	1	1	2	1	1
3:22.5	54	12.2	18	1	1	2	1	1
3:23.5	55	12.2	18	1	1	2	1	1
3:24.5	56	12.2	18	1	1	2	1	1

VK WEST - STH PACIFIC

JTC	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000
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VK EAST - USA/CARIBBEAN

VK STH - USA/CARIBBEAN

VK WEST - USA/CARIBBEAN

HAMADS

TRADE ADS

● **WEATHER FAX** programs for IBM XT/ATs. RADFAX \$35, is a high resolution shortwave weatherfax, more & RTTY receiving program. Needs GCA, 558Hz radio & RADFAX decoder. Also RF2HERC, RF2EDA and RF2VGA, same as RADFAX but suitable for Hercules. EGA and VGA cards respectively. SATFAX \$45, is a NOAA Meteor and GMS weather satellite picture receiving program. Uses EGA or VGA modes. Needs EGA or VGA colour monitor and card & WEATHER FAX PC card 137MHz receiver. All programs are on 5.25" or 3.5" disks (state which) & documentation, add \$3 postage. ONLY from MI Delahanty, 48 Veterans St., New Farm MD 4005. Ph (707) 356-8785.

● **Disposal of Weather Facsimile Recorders**
The Bureau of Meteorology has for disposal a number of Alden Weather Facsimile Recorders, capable of reproducing both weather charts and satellite imagery (grey scale). The units have both AID (VMO form at) and baseband inputs, and with a suitable interface to an HF radio receiver, could reproduce the weather charts routinely broadcast by the Bureau's AXM (Canberra) AID (Darwin) or other radio facsimile stations. The recorders use 11 inch electrolytic paper, and complete a 240v to 110v mains transformer, recording head and control electronics. They will be available on a "lot" basis at most state capital cities for \$200 each. Expressions of interest are requested in writing by 30/6/92, directed to the following:
Mr Phil O'Donnell
Communications and Computing Branch
Bureau of Meteorology
P.O. Box 100
Melbourne Vic 3001
Please DO NOT enclose any money with your expression of interest.

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FOR SALE - ACT

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